

ADA130175

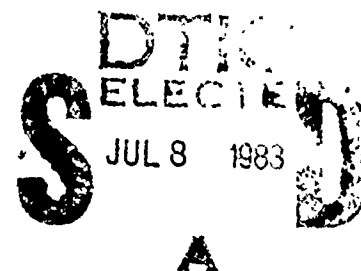
AFGL-TR-82-0398
ENVIRONMENTAL RESEARCH PAPERS, NO. 818



1978 Diffuse Auroral Boundaries and a Derived Auroral Boundary Index

M.S. GUSSENHOVEN
D.A. HARDY
N. HEINEMANN
E. HOLEMAN

28 December 1982



Approved for public release; distribution unlimited.

DTIC FILE COPY

SPACE PHYSICS DIVISION
AIR FORCE GEOPHYSICS LABORATORY
HANSCOM AFB, MASSACHUSETTS 01731

PROJECT 2311

AIR FORCE SYSTEMS COMMAND, USAF



83_07_6_209

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AFGL-TR-82-0398	2. GOVT ACCESSION NO. AD-A130175	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) 1978 DIFFUSE AURORAL BOUNDARIES AND A DERIVED AURORAL BOUNDARY INDEX		5. TYPE OF REPORT & PERIOD COVERED Scientific. Interim.
7. AUTHOR(s) M.S. Gussenhoven* N. Heinemann* D.A. Hardy E. Holeman**		6. PERFORMING ORG. REPORT NUMBER ERP No. 818
9. PERFORMING ORGANIZATION NAME AND ADDRESS Air Force Geophysics Laboratory (PHG) Hanscom AFB Massachusetts 01731		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS Air Force Geophysics Laboratory (PHG) Hanscom AFB Massachusetts 01731		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 61102F 2311G1BA
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE 28 December 1982
		13. NUMBER OF PAGES 210
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES * **Physics Dept., Boston College, Chestnut Hill, MA Emmanuel College, Lexington, MA This work was partially supported under contract F19628-81-K-0032 and F19628-82-K-0039		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Diffuse aurora Boundaries Precipitating electrons Auroral index Auroral oval Auroral activity		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) DMSP/F2 and F4 precipitating electron data are used to determine statistically the systematic variations of the equatorward boundary with Kp as a function of local time. The boundaries were chosen by hand for every DMSP/F2 satellite pass in 1978. These in turn are used to assess an algorithm developed to choose the boundaries automatically. From the statistical variations each boundary is projected to a midnight boundary. The projected midnight boundary served as an index of auroral activity—The Auroral Boundary-Index. Listings of the 1978 hand- and computer-chosen		

DD FORM 1 JAN 73 1473

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

cont

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

20. (Contd)

boundaries and the Auroral Boundary Index for 1978 are included in
appendices.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

DTIC
COPY
INSPECTED
2

We would like to thank Oracio Barbosa, Rebecca Carovillano, Deborah Gustafson, Robert Hilmer, Joan Hogan and Timothy Schumaker for their help in the production of the final hand-chosen boundary set. Thanks also to Joseph Cronin and Dianne Riehl who developed the computer software which was used to produce the monthly plots, and to Kenneth McGee for preliminary plot production. A special second thanks to Dianne Riehl who, with consistent good humor, produced several "final" versions of all the monthly plots used in this report. Finally, another special thanks to Mary Outwater for secretarial support. The work of M.S. Gussenhoven and N. Heinemann was supported by the Air Force Geophysics Laboratory under Contract F19628-81-K-0032; the work of E. Holeman was supported by the Air Force Geophysics Laboratory Contract F19628-82-K-0039.

Contents

1. INTRODUCTION	9
2. INSTRUMENTATION	11
3. HAND SELECTION OF EQUATORWARD BOUNDARIES	12
4. COMPUTER ALGORITHM FOR BOUNDARY SELECTION	19
5. ANALYSIS OF DIFFERENCES BETWEEN HAND-CHOSEN AND ALGORITHM-CHOSEN BOUNDARIES	24
6. AURORAL BOUNDARY INDEX	35
7. DISCUSSION	55
REFERENCES	59
APPENDIX A: Auroral Boundary Index	61
APPENDIX B: 1978 Auroral Boundary Listing	75

Illustrations

1. A Polar Plot in Magnetic Local Time—Magnetic Latitude Coordinates Showing the Diurnal Range of the DMSP/F2 Orbits in January 1978 (solid line), and in December 1978 (dashed line)	11
2. Integral Flux in $(\text{cm}^2\text{-ster-s})^{-1}$ (bottom panel), Energy Flux in $\text{keV}(\text{cm}^2\text{-ster-s})^{-1}$ (middle panel), and Average Energy in keV (top panel) of Precipitating Electrons Measured by the DMSP/F2 Satellite Passing Over the South Pole on 18 May 1978	13
3. Precipitating Electron Data for a South Pole Pass on 4 April 1978	16
4. Precipitating Electron Data for a North Pole Pass on 28 August 1978	17
5. Precipitating Electron Data for a North Pole Pass on 21 January 1978	18
6. Precipitating Electron Data for a South Pole Pass on 12 December 1978	19
7. Distribution of the Residual Scatter in the Hand-chosen Boundary Set When Compared to Linear Regression Values Obtained From the Same Set	28
8. Distribution of the Residual Scatter in the Computer-chosen Boundary Set When Compared to Linear Regression Values Obtained From the Same Set	29
9. Distribution of the Differences Between Hand- and Computer-chosen Boundaries ($\lambda_{\text{H}} - \lambda_{\text{A}}$) for the Evening Sector	30
10. Same as Figure 9, for Morning Sector	30
11. Same as Figure 9, for Evening and Morning Sectors Combined	31
12a. Three-hour Average of Kp' Calculated From Hand-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978	37
12b. Same as Figure 12a, Using Only Evening Boundaries	38
12c. Same as Figure 12a, Using Only Morning Boundaries	39
12d. Three-hour Average of Kp' Calculated From Algorithm-chosen Morning and Evening Equatorward Auroral Boundaries Plotted as a Function of Universal Time for March 1978	40
12e. Same as Figure 12d, Using Only Evening Boundaries	41
12f. Same as Figure 12d, Using Only Morning Boundaries	42
12g. Equivalent Midnight Boundary Calculated From Hand-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978	43
12h. Same as Figure 12g, Using Only Evening Boundaries	44
12i. Same as Figure 12g, Using Only Morning Boundaries	45
12j. Equivalent Midnight Boundary Calculated From Algorithm-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978	46
12k. Same as Figure 12j, Using Only Evening Boundaries	47
12l. Same as Figure 12j, Using Only Morning Boundaries	48

Illustrations

13a.	Scatter Plot of the Values of K_p vs the Corresponding Three-hour Average Value of K_p' (labelled K_{PRIME}) When K_p' is Calculated Using Hand-chosen Morning and Evening Equatorward Auroral Boundaries Obtained in March 1978	49
13b.	Same as Figure 13a, Using Only Values of K_p' Determined From Evening Boundaries	50
13c.	Same as Figure 13a, Using Only Values of K_p' Determined From Morning Boundaries	51
13d.	Scatter Plot of the Values of K_p vs the Corresponding Three-hour Average Value of K_p' (labelled K_{PRIME}) When K_r is Calculated Using Computer-chosen Morning and Evening Equatorward Auroral Boundaries Obtained in March 1978	52
13e.	Same as Figure 13d, Using Only Values of K_p' Determined From Evening Boundaries	53
13f.	Same as Figure 13d, Using Only Values of K_p' Determined From Morning Boundaries	54
14.	Scatter Plot of the Corresponding Values of Three-hour Averages of K_p' Calculated Using Hand-chosen [labelled $K_{PRIME} (HAND)$] and Algorithm-chosen [labelled $K_{PRIME} (ALGO)$] Morning and Evening Equatorward Boundaries Obtained in March 1978	55

Tables

1.	Regression Values for $\lambda = \alpha + \beta K_p$	26
2.	Percentages of Residual Scatter	27
3.	Percentages of Differences	31
4.	Hand- vs Algorithm-Chosen Boundaries	32
5.	Correlations of K_p vs $\overline{K_p'}$	36

1978 Diffuse Auroral Boundaries and a Derived Auroral Boundary Index

1. INTRODUCTION

This report has two aims. First, to provide the scientific community a compilation of all equatorward boundaries of the auroral oval as determined from the SSJ/3 data on the DMSP/F2 satellite for the year 1978. Second, to review and extend the knowledge of the systematics of the position of the equatorward boundary with respect to geomagnetic activity and the degree to which the boundary determination can be done by computer. From this we are able to construct a new index of auroral activity.

The first of these aims is motivated by research that has shown the boundary to move in a consistent and systematic manner in response to geomagnetic activity as measured by Kp, the velocity of the solar wind, and the strength of the north-south component of the Interplanetary Magnetic Field.¹⁻⁷ This work has shown that the boundaries can be used as an indirect measure of the strength and orientation of the magnetospheric electric field when the assumption is made that the equatorward boundary maps to the zero energy Alfvén layer in the magnetic equatorial plane. Calculations of the total cross magnetospheric potential drop determined from the average location of the boundaries were found to be in reasonable

(Received for publication 27 December 1982)

(Due to the large number of references cited above, they will not be listed here.
See References, page 59.)

agreement with measurements of the average cross polar cap potential measured by probes.⁷ Since the location of the boundary appears to reflect large-scale processes taking place in the magnetospheric system, it should provide a valuable tool in the study of geomagnetic phenomena.

The second of these aims is motivated by the need of the Global Weather Central of the Air Force Weather Service for a means of specifying in near real time the global extent of electron precipitation and the level of geomagnetic activity. The present work contributes to fulfilling the need of GWC in three ways. First, the set of boundaries compiled for this report represents a significant portion of the data set used to derive the systematics of the boundary location. Knowledge of these systematics has been used to extrapolate the global position of the boundary based on a single point determination of the boundary made in near real time from DMSP satellite data.⁸ Second, the computer-chosen boundaries and the algorithm used in their selection represent an extension of work previously done for GWC on techniques for automatically determining the location of the boundary in near real time using the raw data from the SSJ/3 sensor on the DMSP satellites.⁹ Lastly, the report shows how the boundary measurements made at different local times can be normalized to magnetic midnight to produce a new index of geomagnetic activity which correlates well with Kp. This new index will be directly available from the DMSP SSJ/4 data.

The report is divided into seven sections, including two appendices. Section 1 describes the instrumentation which provided the data used in this study. Section 2 deals with the format of the data used in the hand determination of the boundaries, the method used in the hand selection of the boundaries and the sources of error or ambiguity in these determinations. Section 3 describes the computer algorithm used to choose the boundaries. Section 4 provides an analysis of the discrepancies between the hand and computer techniques. Section 5 describes the process by which the auroral activity index was produced. Appendix A gives plots of the equivalent midnight boundary from the hand determined data set by month for 1978; the Auroral Boundary Index for one year. Appendix B gives a complete listing of both boundary data sets for 1978.

8. Hardy, D. A., and Holeman, E. (1983) The Global Auroral Boundary Code for the Global Weather Central of the Air Weather Service (to be published).
9. Hardy, D. A., and MacKean, R. (1980) An Algorithm for Determining the Boundary of Auroral Precipitation Using Data from the SSJ/3 Sensor, AFGL-TR-80-0028, AD A084482.

2. INSTRUMENTATION

DMSP/F2, a three-axis stabilized satellite, was launched into a near sun-synchronous, circular orbit at an altitude of 840 km in June 1977. Its orbital period was 101 min; the nominal inclination, 98.75° . At launch the orbit was centered near the 0700-1900 meridian but was subject to a very slow precession toward later local times. Due to the offset between the Earth spin axis and magnetic axis, the orbit had significant diurnal and seasonal variations in the magnetic local time-magnetic latitude frame of reference. Thus, equatorial auroral boundaries could be determined over a wider range of MLT than might be assumed from the restricted geographical local time locations of the orbit. Figure 1 shows the diurnal coverage

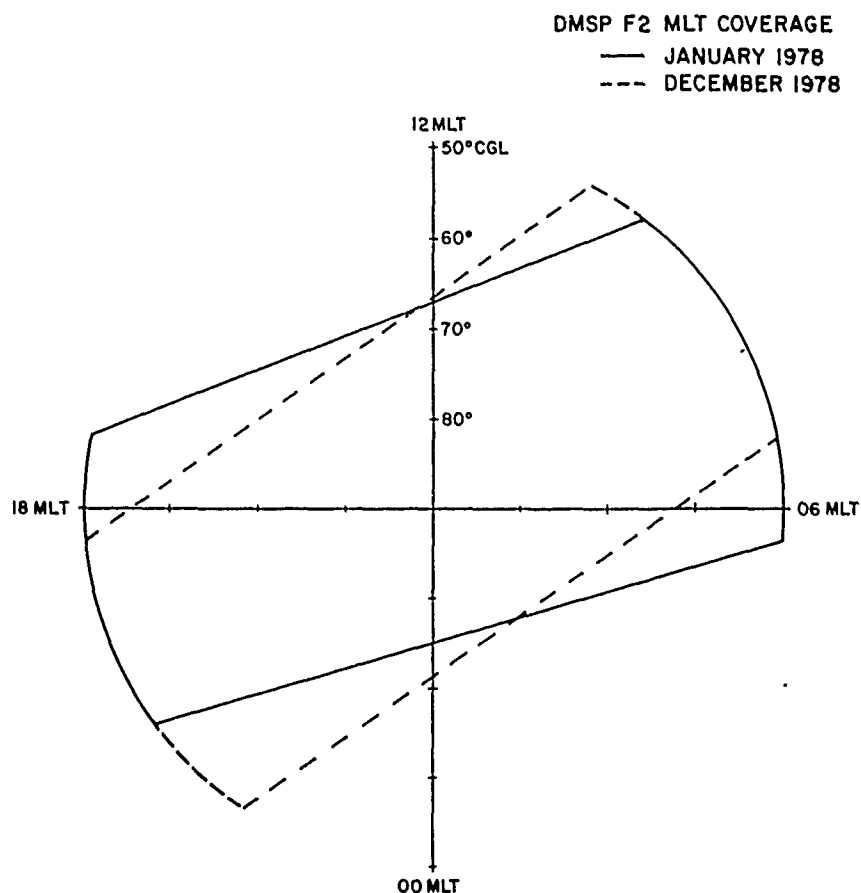


Figure 1. A Polar Plot in Magnetic Local Time—Magnetic Latitude Coordinates Showing the Diurnal Range of the DMSP/F2 Orbits in January 1978 (solid line), and in December 1978 (dashed line)

of DMSP/F2 in magnetic local time and magnetic latitude for January 1978 (solid line), and December 1978 (dashed line). Good coverage exists in the dawn and dusk sectors. Little coverage exists in the noon, post-noon and the midnight, post-midnight sectors. To extend the boundary statistics into these regions data from a later satellite, DMSP/F4, launched in April 1979 was also used. Identical particle detectors were flown on both satellites. It should also be noted that DMSP satellites are operational Air Force satellites. As such, except during periods of down-link transmissions, data are almost always being recorded. In 1980-1982, because of the failure of DMSP/F5 at launch, there is a break in the coverage, but DMSP/F6 was launched in late 1982.

The particle detector on DMSP/F2 consists of two curved plate electrostatic analyzers that measure the fluxes of electrons in 16 energy channels between 50 eV and 20 keV once per second. The apertures of the analyzers always face in the local zenith direction such that at auroral and polar cap latitudes they detect precipitating rather than backscattered and/or trapped electrons. One analyzer covers the energy range from 50 eV to 1 keV with a geometric factor of $4 \times 10^{-4} \text{ cm}^2 \text{ ster}$ and a $\Delta E/E$ of 13 percent. The other analyzer covers the energy range from 1 keV to 20 keV with a geometric factor of $10^{-3} \text{ cm}^2 \text{-ster}$ and a $\Delta E/E$ of 9 percent. The large geometric factors insure that the flux level for electrons in the diffuse aurora is well above the detector's sensitivity. A detailed description of the detector is given by Hardy et al.¹⁰

3. HAND SELECTION OF EQUATORWARD BOUNDARIES

An example of DMSP/F2 electron data, taken from a south polar pass on 18 May 1978, is given in Figure 2. For this pass $K_p = 1+$. Data are plotted as JTOT, the directional integral flux ($\text{cm}^2 \text{-sec-ster})^{-1}$ in the bottom panel; JETOT, the directional energy flux ($\text{keV/cm}^2 \text{-sec-ster}$) in the middle panel; and EAVE, the average energy in keV in the top panel. The scale for EAVE is linear. These quantities are plotted as functions of universal time in seconds of the day, the geographic and corrected geomagnetic latitudes and longitudes, and the magnetic local time of the satellite all projected to an altitude of 110 km.

Several features of the electron precipitation that pertain to the choice of auroral boundaries are illustrated in Figure 2. First, equatorward of the auroral precipitation there is a broad region over which there is a slight rise in JTOT with relatively large values of JETOT and EAVE. In Figure 2 these lie between

10. Hardy, D.A., Gussenhoven, M.S., and Huber, A. (1979) The Precipitating Electron Detectors (SSJ/3) for the Block 5D/Flights 2-5 DMSP Satellites: Calibration and Data Presentation, AFGL-TR-79-0210, AD A083135.

9480-9690 UT and between 10,620-10,800 UT. The increases are due to radiation belt particles that penetrate the detector casing and directly stimulate the channeltrons. Since they have nothing to do with the auroral precipitation, they must be differentiated from the auroral electrons when determining boundaries. Due to the difference in the size of channeltrons used in the two detectors, radiation belt contamination is largely limited to the energy channels of the 1 to 20 keV detector.

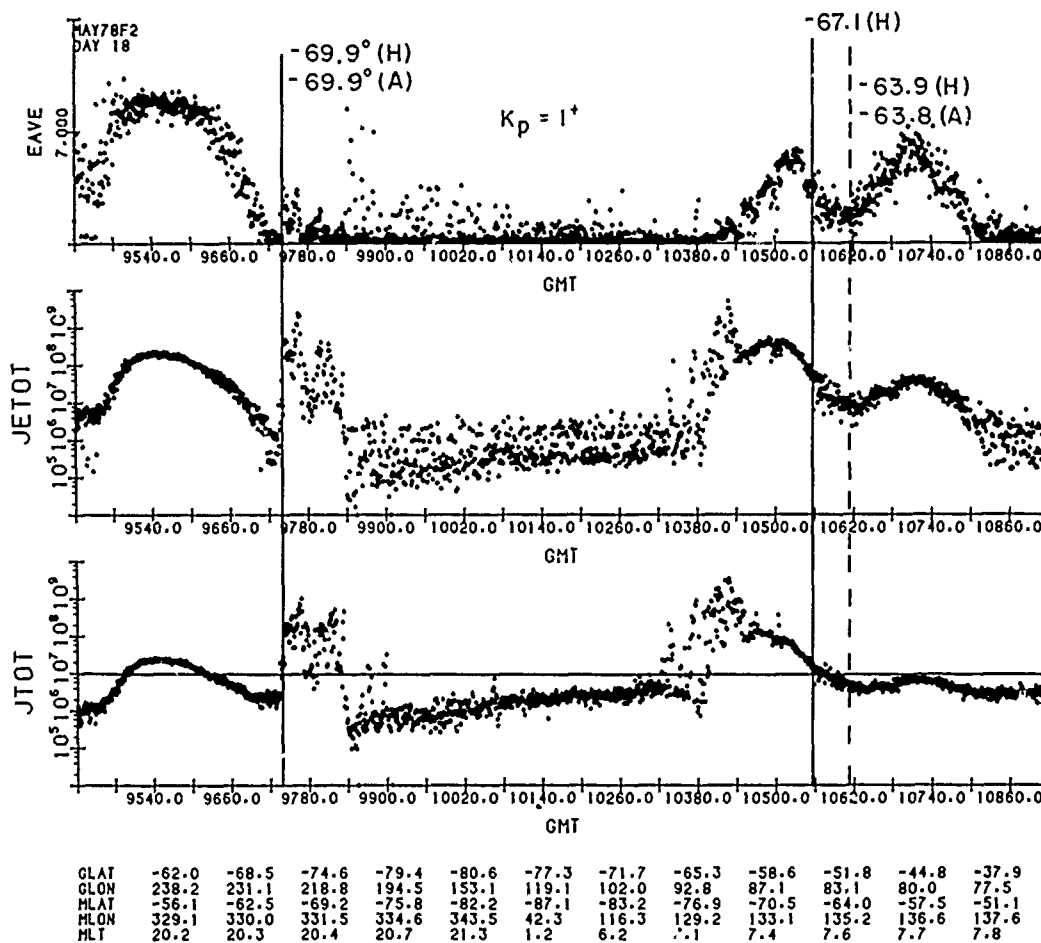


Figure 2. Integral Flux in $(\text{cm}^2\text{-ster-s})^{-1}$ (bottom panel), Energy Flux in $\text{keV } (\text{cm}^2\text{-ster-s})^{-1}$ (middle panel), and Average Energy in keV (top panel) of Precipitating Electrons Measured by the DMSP/F2 Satellite Passing Over the South Pole on 18 May 1978. These values are plotted as functions of universal time (in seconds), geographic and corrected geomagnetic latitudes and longitudes and the magnetic local time of the satellite all projected to an altitude of 100 km. Solid (dashed) vertical lines indicate 10^7 ("better") equatorward boundaries of precipitating auroral electrons chosen by hand (H). Algorithm-chosen boundaries (A) are indicated by a dot-dash line when they differ from the hand boundary by more than 0.3° CGL.

Second, we have found the condition $JTOT > 10^7 \text{ (cm}^2\text{-sec-ster)}^{-1}$, indicated in Figure 2 by the horizontal line (the 10^7 level) provides a useful "zero-order" criterion for selecting the equatorward boundaries of the oval. The solid, vertical lines drawn where the data points rise above the 10^7 level, going in the poleward direction, are referred to as 10^7 boundaries.

Third, the evening equatorward boundary is sharper than its morning side counterpart. On the morning side in Figure 2 JTOT rose from background to $10^7 \text{ (cm}^2\text{-sec-ster)}^{-1}$ over 3.2° latitude, whereas the evening side rise was nearly instantaneous. Generally, gradients in the electron flux with latitude are found near both equatorward boundaries. The gradient never extends more than a few degrees latitude in the evening sector, but can cover as much as 10° on the morning side where it is always perceptibly present. A dashed line on the morning side in Figure 2 is drawn at the point where JTOT rises noticeably above background, to include the flux gradient within the auroral boundary. This is referred to as a "better" boundary.

Because of the nearly instantaneous rise of the data on the evening side, most of the evening boundaries are 10^7 boundaries. Because of flux gradients on the morning side, morning boundaries are generally "better" boundaries. In Appendix B "better" boundaries (or 10^7 boundaries when the two are the same) are listed. This is the set of boundaries which has been used for various statistical studies.

The 10^7 boundary is quite precise, but the criteria used for choosing the "better" boundary are more subjective, and cause some ambiguity. On both morning and evening sides of the oval, the onset of electron precipitation can be obscured in various ways.

In the evening sector the principal ambiguity in choosing boundaries is caused by contamination of the low energy channels of the detector by photoelectrons. Gussenhoven et al⁶ discuss this problem in detail. In these data this contamination shows up as a high equatorward background level which can exceed a level of 0.5×10^7 on the JTOT scale. Although the choice of auroral boundaries is generally clear the ambiguity results from the fact that it is impossible to tell if, and how far, the aurora might extend below the JTOT level produced by the photoelectrons. Clearly, when the background level is close to or above the 10^7 level on the JTOT scale choosing a 10^7 boundary is impossible.

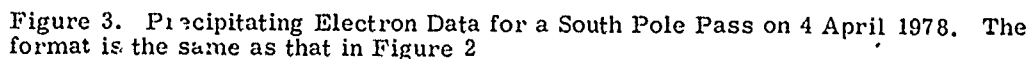
In the morning sector uncertainties in identifying the position of the boundary are more severe. There are three sources of uncertainty: (1) a much more gradual latitudinal onset of precipitation than is found in the evening, (2) overlap between regions of energetic electron precipitation and radiation belt contamination of corresponding energy channels, and (3) the existence of energetic plasma close to but detached from the boundary.

The gradual latitudinal onsets of precipitation with increasing latitude, are called ramps (Figure 2, morningside). Ramps may occur on both morning and evening sides of the north and south poles, but are less frequent and less extensive on the evening side. They occur nearly all the time on the morning side generally producing a lower boundary when compared to the evening side. Ramps cause severe problems in two different ways: (1) when they are combined with a high equatorward background (as discussed in the case of evening boundary ambiguities), and (2) when the morning side gradient extends into regions of radiation belt contamination. Even when not obscured there can be ambiguity in choosing where a gradual ramp begins. In choosing the morning boundaries it is almost always necessary to use changes in the average energy and the energy flux, as well as those in the number flux.

Overlap between the region of energetic electron precipitation in the auroral zone and the region of contamination of energy channels by radiation belt particles is shown in Figure 3, a pass over the south pole on 4 April 1978, for which $K_p = 5-$. On the morning side of the oval one can see that the rise in JTOT, JE1 O1 and EAVE, due to contamination, is contiguous to the region of auroral precipitation. When the radiation belt particles exhibit a characteristically smooth curve an attempt is made to determine the onset of auroral particle precipitation by drawing the boundary at the point where irregularity begins as was done in this example. In this case the morning boundary was drawn at -60.7° MLAT, but choices down to -56.6° (the 10^7 boundary) are defensible giving an uncertainty of 4.1° . However, when the radiation belt and particle signatures are both irregular there is even greater uncertainty in the boundary choice. Because of the sudden onset of auroral electron precipitation on the evening side, radiation belt particle contamination is rarely a problem, as Figure 3 also shows.

At lower K_p , as in Figure 2, radiation belt interference produces no problems since the aurora is contracted enough to leave the radiation belt particles clearly outside the oval. Radiation belt interference is most problematic at moderately high activity levels ($K_p = 3$ to 6). For these activities it is often the case that a clear separation between JTOT levels produced by auroral and radiation belt effects cannot be made. At very high K_p , the problems are again manageable since fluxes are so intense they appear to mask the effect of the radiation belt particles. An example of this type of occurrence is shown in Figure 4, a north pole pass on 28 August 1978, for which $K_p = 8$.

The third effect (detached energetic plasma) can be found in both morning and evening regions and an example is shown in Figure 5. This example shows a north pole pass on 21 January 1978, during a time of magnetospheric quiet ($K_p = 0$). On the evening side there are small regions of energetic electrons near to but detached



The final problem encountered in this data set is with those morning south pole equatorward boundaries which fall between 0900-1300 MLT. Electron precipitation patterns in the diffuse auroral region during these local times are observed to vary from a normal diffuse aurora to the complete disappearance of the diffuse aurora within detector sensitivity. In the latter instances only the magnetospheric cusp is encountered. An example of a pass with no dayside diffuse aurora is shown in

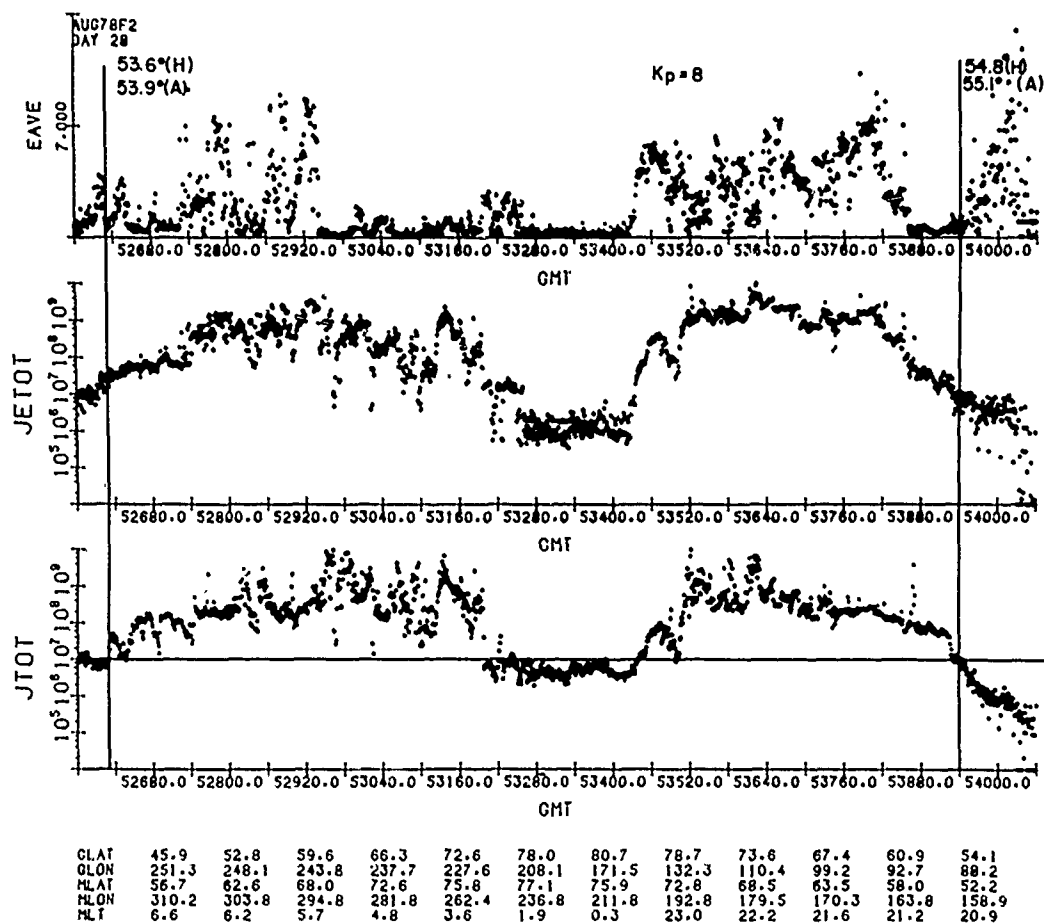


Figure 4. Precipitating Electron Data for a North Pole Pass on 28 August 1978. The format is the same as that in Figure 2

Figure 6, a south pole pass on 12 December 1978, for which $K_p = 2-$. For cases such as these no equatorward boundary is listed. Problems arise when the diffuse aurora is weak and irregular. As may be seen in Figure 1, DMSP/F2 is only in the pre-noon sector for a few passes per day, so any problems with the 1978 data sets should be minimal. The dynamics of the dayside diffuse auroral electron precipitation will be discussed in a forthcoming paper. For the time being, however, listed boundaries between 0900-1300 MLT should be treated judiciously, and we advise referencing the actual data to determine what is being measured in these instances.

The above effects produced greater than 1 degree uncertainty in the equatorial boundary only for a small percentage of the total cases. On the evening side

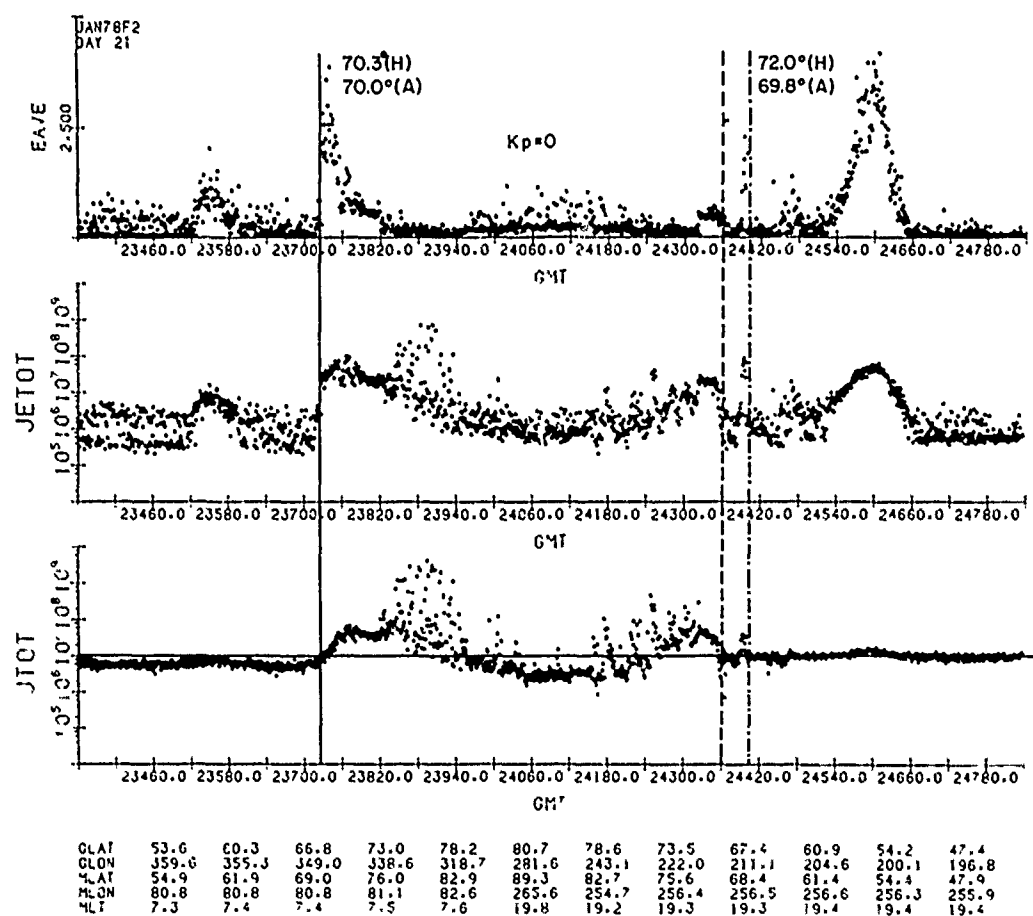


Figure 5. Precipitating Electron Data for a North Pole Pass on 21 January 1978. The format is the same as that in Figure 2

approximately 90 percent of boundaries were determined with no ambiguity; on the morning side, approximately 70 percent. After making more than 20,000 boundary determinations by hand, we feel that a high enough level of consistency has been reached to justify using the hand-chosen boundary set to verify the algorithm which has been developed to select boundaries automatically. In actuality, this verification turned out to be a two way process which has enabled us to decide which of several algorithm tests works best for determining morning and evening auroral boundaries (as discussed in Section 4), and to eliminate from the hand-chosen data set most of the glaring errors. As a result of this cross-verification, we have two data sets in which we have a high level of confidence.

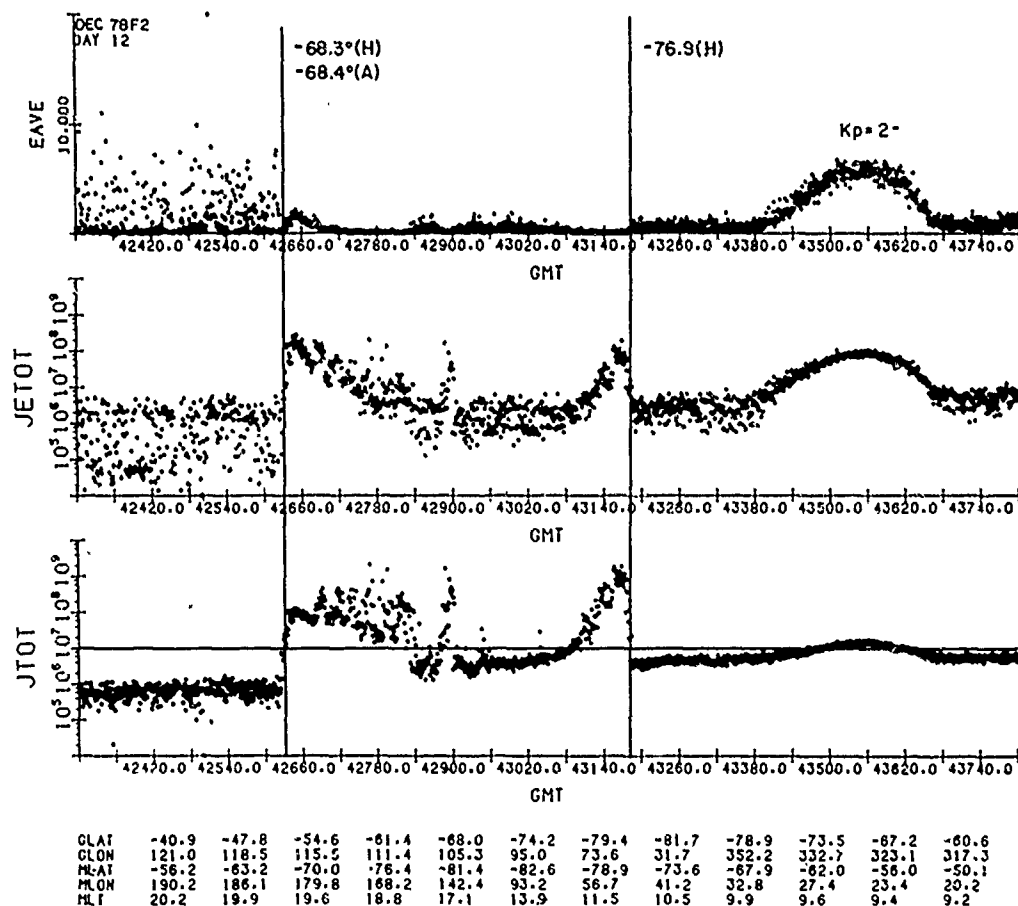


Figure 6. Precipitating Electron Data for a South Pole Pass on 12 December 1978. The format is the same as that in Figure 2

4. COMPUTER ALGORITHM FOR BOUNDARY SELECTION

In devising methods for choosing equatorward auroral boundaries by computer we made use of two factors that we found to be generally applicable in choosing the boundaries by hand; (1) on the evening side the electron precipitation begins (on the equatorward edge proceeding poleward) with increases in the flux at the lowest energies, often resulting in a gradual rise in average energy, and (2) on the morning side the precipitation onset is most reliably seen in the 1-10 keV energy range, resulting in an average energy rise which is rather abrupt. Thus, an increase over background in the energy range < 1 keV will be used to signal the evening boundary, and an increase over background in the keV electrons, used to signal the morning

boundary. The complexity of the tests used reflects the difficulty often encountered in determining that the signal is above background.

Photoelectron contamination is avoided in the low energy particle signal by eliminating counts from the two lowest energy channels. Contamination of the higher energy signal by radiation belt particles is more complex and requires tests that make use of the fact that the low energy detector (channels 9 to 16) has only $\sim 1/10$ the contamination of the high energy detectors (channels 1 to 8), and that the contamination in the high energy detector gives a uniform count signal in all channels.

In this section we will describe the preparation of the data base, the construction of test quantities from the data, and the application of the tests that produced the 1978 set of computer- (algorithm-) chosen equatorward boundaries. The DMSP test data for the SSJ/3 instrument are stored on a series of 6250 BPI tapes, each containing several months of raw data from either the F2 or F4 satellite. The data base is analyzed one month at a time for boundary information. The first step in this procedure is to run program DSFMPEP on a month's data with control parameters set to strip off all data with absolute magnetic latitude greater than 50° . Program STDKC3 then searches this intermediate file for boundary crossings. STDKC3 logically divides the file into quarter orbit segments by successive calls to subroutine SEARCE. For each call to SEARCE, information for up to 300 consecutive 4-sec data records is stored in the matrix ITST for subsequent analysis. For each quarter orbit, SEARCE determines whether the data are occurring in ascending or descending order of absolute geomagnetic latitude as a function of time. If the geomagnetic latitude is decreasing, the data are stored in inverse order beginning in location 300 so that STDKC3 always sees a quarter orbit file in order of increasing geomagnetic latitude.

The ITST matrix is preset to a value of -1, and the relative location in ITST for a particular 4-sec data record is calculated from the elapsed universal time since the beginning of the quarter orbit. Hence, time gaps are automatically embedded as a series of one or more lines of all minus ones. The end of a quarter orbit is defined to be where the data goes from one side of geomagnetic midnight (43,200 secs) to the other for the ascending latitude half of a polar pass and the 50° latitude boundary for the descending magnetic latitude half. The last valid position in the data file is marked for the next call and control returned to STDKC3.

The DMSP raw data file is a series of consecutive data records, each containing a time and ephemeris record and four consecutive 16-channel spectral observations seen by the SSJ/3 instrument. Each spectrum is acquired over approximately one second of elapsed universal time. For statistical purposes these four spectra are added together to form a unit data record and its information stored in one line of ITST. ITST is dimensioned as (300, 18) and the 18 words corresponding to the N'th ITST line are defined as follows:

ITST (N, 1) through ITST (N, 8) are the number of counts in consecutive energy channel pairs 1 + 2, 3 + 4, . . . , 15 + 16 (the channel numbers increase with decreasing energy);

ITST (N, 9): Counts in channel 8 (high energy detector, 985 eV channel);
 ITST (N, 10): Counts in channel 9 (low energy detector, 972 eV channel);
 ITST (N, 11): Universal time;
 ITST (N, 12): Geomagnetic latitude;
 ITST (N, 13): Magnetic local time;
 ITST (N, 14): 110 km latitude;
 ITST (N, 15): 110 km longitude;
 ITST (N, 16): Altitude;
 ITST (N, 17): Geographic latitude;
 ITST (N, 18): Geographic longitude.

STDKC3 analyzes the 300 record ITST quarter orbit file in sequential order until three of six defined pseudo statistical tests are satisfied. When this happens a successful boundary determination has been made. The universal time at which each test was satisfied along with its corresponding magnetic latitude and local time are recorded in the computer boundary file. The six test quantities are defined as follows:

JTST₁: low energy integral count signal omitting the two lowest energy channels.

$$JTST_1 = S_1 \sum_{i=9}^{14} N_i,$$

where N_i is the observed counts in channel i , and

$$S_1 = 0.1 \text{ (scale factor).}$$

JTST₂: 8-4-2-1 weighted (toward high energy) RMS variance of 1st four channel pairs.

$$JTST_2 = \frac{S_2}{\sqrt{1}} \left\{ \frac{1}{w} \sqrt{w \sum_{i=1}^4 w_i I_i^2 - \left(\sum_{i=1}^4 w_i I_i \right)^2} \right\},$$

where

$$w = \sum_{i=1}^4 w_i;$$

$$w_i = \{ 8, 4, 2, 1 \} \text{ weighting factors;}$$

I_i : counts in i 'th channel pair, 1+2, 3+4, and so on;

$$\bar{I} = \frac{\sum_{i=1}^4 w_i I_i}{w} ;$$

$$S_2 = 10 .$$

JTST₃: 1-2-4-8 weighted (toward low energy) rms variance in first four channel pairs. The definition is the same as for JTST₂, but with

$$w_i = \{1, 2, 4, 8\} ;$$

$$S_3 = 10 .$$

JTST₄: difference function between 5.5-20 keV counts and 1-3.5 keV counts.

$$JTST_4 = \frac{S_4 |I_1 + I_2 - I_3 - I_4|}{\sqrt{\max(I_1 + I_2, I_3 + I_4)}}$$

where

$$S_4 = 10 .$$

JTST₅: unweighted rms variance in 1st four channel pairs. The definition is the same as for JTST₂, but with

$$w_i = \{1, 1, 1, 1\} ;$$

$$S_5 = 10 .$$

JTST₆: ratio of counts in channel 8 to those in channel 9.

$$JTST_6 = S_6 \frac{N_8}{N_9} ;$$

$$S_6 = -10 .$$

Tests 2, 3 and 5 are of the form $S\sqrt{I} \sigma_p$ where σ_p is the normalized statistical variance ($\sigma_p = \frac{\sigma}{I}$). It was found empirically that this form gave a more reliable signal than either σ or σ_p alone.

$JTST_1$ is the sum of the counts in the six channels of the SSJ/3 sensor between 110 eV and 1000 eV. On the evening side of the oval counts in this energy range are normally observed first as the satellite passes the auroral oval boundary.⁹ The two lowest channels are excluded since they are often contaminated by conjugate photoelectrons. $JTST_2$ is the weighted rms variance of the four channel pairs in the energy range from 1 to 20 keV. These are the channels that are affected by penetrating particles from the radiation belts. Since these particles directly stimulate the channeltrons each of the eight channels should see the same number of counts within statistics such that the rms variance ($JTST_5$) is small when there is no other signal. If counts from auroral fluxes are present they should be highly non-uniform over this energy range and would act to increase the rms variance. The weighting for $JTST_2$ is toward the highest energy channels. $JTST_3$ is the same as $JTST_2$ except that the weighting is toward the 1 keV end of the range. $JTST_4$ is the absolute difference in the 4-sec sum of counts in the four channels between 5.5 and 20 keV and the four channels between 1 keV and 3.5 keV divided by the square root of whichever of these sums is greater. The idea again is that if auroral counts are present this difference will be larger than if only counts from penetrating particles are present. This test was not used to determine the final boundary but was retained since it is the same as the test developed by Hardy and MacKean for GWC. $JTST_5$ is the same as $JTST_2$ and $JTST_3$ except with no weighting. $JTST_6$ is the ratio of channels 8 to channel 9. Both these channels are at approximately 1 keV but channel 8 should see the effects of penetrating particles and channel 9 should not. Based on the difference in the geometric factors between channel 8 and 9 the ratio should be approximately 3 if both channels were measuring the same flux. If the ratio is much higher than this it means that channel 8 has significant counts due to penetrating electrons.

STDKC3 treats each of these six quantities as an independent statistic with an empirically determined normal, average, or threshold value when the satellite is at latitudes below the auroral boundary. When a statistic is above its threshold value for a sufficiently long time period, the boundary flag for that statistic is turned on. That time period was chosen as one 4-sec interval for $JTST_1$ and three 4-sec intervals for the remaining tests. STDKC3 scans the quarter orbit file from its beginning, setting the flag for each test until flags are on for $JTST_2$, $JTST_5$ and $JTST_6$ at the same time. STDKC3 retains the geomagnetic latitude and magnetic local time at which the flag for each test was set. Once the flags for $JTST_2$, $JTST_5$, and $JTST_6$ are set the boundary is chosen on the morning side of the oval at the point where the flag for $JTST_2$ was set and on the evening side of the oval at the point where $JTST_1$ was set.

Once a signal for a given test is turned on it is possible for its corresponding statistic to return to its threshold level or below. If $JTST_1$ and $JTST_5$ along with either $JTST_2$ or $JTST_3$ are below threshold for two consecutive 4-sec time intervals before the boundary search reaches a normal termination ($JTST_{2, 5, 6}$ on), all signals are turned off and the search resumed. Independent of that $JTST_5$ is turned off if its statistic is below threshold for five consecutive 4-sec time intervals.

The actual thresholds chosen for the six quantities were $T_c = \{12, 18, 16, 30, 18, -50\}$. These were chosen empirically using approximately 500 case histories before the procedure was applied to the entire DMSP data base to construct the final computer boundary file.

Time gaps in the data file had to be dealt with. One and two 4-sec time gaps were ignored since they could cause at most a 8-sec error in the boundary determination. However, if a longer time gap occurred, all flags were turned off. Also, if any of the six signals occurred immediately after a time gap longer than 8 sec, its boundary was flagged as questionable in the computer boundary file. The beginning of a quarter orbit file was logically treated as if it were occurring after a large time gap for the time gap logic. If the data were exhausted before all flags were set, the current status of each was written into the boundary file, and labelled as questionable. Also, the boundary latitudes were examined and labelled questionable if they were above 72° . A record was written for each of the quarter orbit files, and analyzed for completeness with all questionable data flagged.

5. ANALYSIS OF DIFFERENCES BETWEEN HAND-CHOSEN AND ALGORITHM-CHOSEN BOUNDARIES

Two methods of analyzing the hand- and algorithm-chosen sets of boundaries are given in this section. The first method relates each set separately to geomagnetic activity, as measured by Kp, by finding, for each local time sector, a linear relationship between Kp and the boundaries. We then compare the linear relationships of both sets, and the residual scatter found within each set. The second method looks directly at the differences between the two boundary choices, and analyzes the causes of the differences when they are found to be systematic and large.

Relationship of boundary sets to Kp. To relate the boundary sets to Kp, 24 1-hr bins in magnetic local time were created and individual boundaries assigned to a bin based on their MLT. Each boundary was tagged with the value of Kp at the time of the boundary crossing. Within each local time bin a linear regression was performed on the corrected geomagnetic latitudes (λ) of the boundaries vs Kp of the form:

$$\lambda = \alpha + \beta Kp .$$

(1)

Table 1 is a list of the results of the regression for those MLT bins in which there are sufficient data. In the table we give the range of the MLT bin, the number of boundaries in the bin used in the regression, the intercept (α) and the slope (β) of the regression line and the correlation coefficient (cc). The results from the hand-chosen and computer-chosen boundaries are listed separately. Hand-chosen boundaries using both F2 and F4 satellite data between September 1977 and February 1980 were used to obtain the regression equations. Computer-chosen boundaries used F2 satellite data from 1978, with selected values from 1979 and 1980 to complete the midnight sector statistics.

Comparing the regression equations from the hand- and computer-chosen boundaries one notes several systematic differences. On the morning side of the oval (MLT's between 0400 and 1200) the regressions on the hand boundaries give intercepts roughly 1° higher and slopes approximated $0.4^\circ/\text{Kp}$ more negative than the computer-chosen boundaries. On the evening side of the oval (MLT's between 1600 and 2400) the regressions on the hand boundaries give intercepts roughly 0.4° lower and slopes approximately the same as the computer-chosen boundaries results.

These differences reflect the limitations on the computer techniques. We attribute the differences on the morning side to the general problem the computer algorithm has in picking up the onset of morning side ramps and to the fact that this difficulty increases with increasing activity as the ramp region and the region of contamination by penetrating radiation more and more overlap. This problem results in computer boundaries higher than hand boundaries and a difference between the two that increases with activity. This leads to a higher average location for the computer boundaries at high Kp such that the slope of the regression curve is forced down and the intercept lowered. The evening side differences result from the threshold for the computer test being set at a high enough level to ensure that counts due to photoelectrons in the low energy channel would not trigger the test. This conservative approach results in the vast majority of computer boundaries being chosen at higher latitudes than the hand boundaries. Since the onset of precipitation on the evening side is normally abrupt at all levels of activity, on average, the difference between hand- and computer-chosen boundaries is the same resulting in the observed 0.4° offset but the same slopes.

Table 1. Regression Values for $\lambda = \alpha + \beta K_p$

Hand-chosen					Computer-chosen				
	Number	α	β	cc		Number	α	β	cc
04-05	267	67.7	-1.48	-0.57		112	67.4	-1.28	-0.52
05-06	1123	67.8	-1.87	-0.71		865	67.0	-1.57	-0.69
06-07	2462	68.2	-1.90	-0.74		1670	67.2	-1.51	-0.70
07-08	3159	68.9	-1.91	-0.76		1926	68.0	-1.52	-0.72
08-09	2159	69.3	-1.87	-0.73		1045	68.2	-1.45	-0.68
09-10	1178	69.5	-1.69	-0.66		441	68.5	-1.21	-0.62
10-11	864	69.5	-1.41	-0.57		220	69.0	-1.12	-0.60
11-12	513	70.1	-1.25	-0.52		27	67.3	-0.47	-0.37
16-17	204	71.6	-1.28	-0.66		123	72.0	-1.15	-0.63
17-18	526	71.1	-1.31	-0.69		341	72.0	-1.35	-0.75
18-19	997	71.2	-1.74	-0.82		652	71.6	-1.71	-0.80
19-20	2469	70.4	-1.83	-0.82		1537	70.7	-1.85	-0.85
20-21	3309	69.4	-1.89	-0.82		1934	69.8	-1.82	-0.83
21-22	3092	68.6	-1.86	-0.79		1513	69.1	-1.73	-0.81
22-23	1485	67.9	-1.78	-0.77		861	68.4	-1.52	-0.71
23-24	461	67.8	-2.07	-0.81		179	67.7	-1.64	-0.54

We next investigated the degree of scatter in the two data sets from their respective regression equations. This was done by subtracting the appropriate regression equation value from each boundary measurement and determining the frequency distribution of the residuals. In Table 2 are listed the percentages of this residual scatter within $\pm 1^\circ$, $\pm 2^\circ$, $\pm 3^\circ$ of zero for computer- and hand-chosen boundaries for morning and evening sides of the oval, both separately and together.

Table 2. Percentages of Residual Scatter

	Morning Side		Evening Side		Entire Oval	
	Computer	Hand	Computer	Hand	Computer	Hand
$\pm 1^\circ$	36%	30%	44%	40%	40%	36%
$\pm 2^\circ$	64%	56%	75%	70%	68%	65%
$\pm 3^\circ$	82%	76%	90%	86%	86%	82%

The spread in the unaccounted scatter for the computer- and hand-chosen boundaries is comparable, the computer boundary spread being approximately 5% narrower. This reflects a higher consistency in the computer-chosen over the hand-chosen boundaries. It is also the case that for both computer- and hand-chosen boundaries the spread is approximately 10° greater on the morning than on the evening side of the oval. Figures 7 and 8 are plots of the distribution of the residual scatter taken over the entire oval for the hand and computer boundaries, respectively. A bin size of 0.1° is used and the number normalized to 1000 cases. It is clear that the distributions are Gaussian. Based upon this and the results listed in Table 2 one can assign to the distributions a sigma of approximately 2° for both computer- and hand-chosen boundaries.

Direct comparison of hand- and computer-chosen boundaries. Distribution of differences between hand- and computer-chosen boundaries for the evening and morning sides of the oval, both separately and together, are shown in Figures 9 through 11. In addition, in Table 3 we show the percentage of the differences within $\pm 1^\circ$, $\pm 2^\circ$ and $\pm 3^\circ$ of zero for the three cases and a comparison to the earlier work of Hardy and MacKean.⁹

The figures and tables illustrate three points. First, all three distribution are strongly skewed towards negative values for the differences between computer- and hand-chosen boundaries. As discussed above, this arises due to the requirement of the computer algorithm for a clearer signal than that required by eye in order to consistently avoid the effects of background and noise in the selection

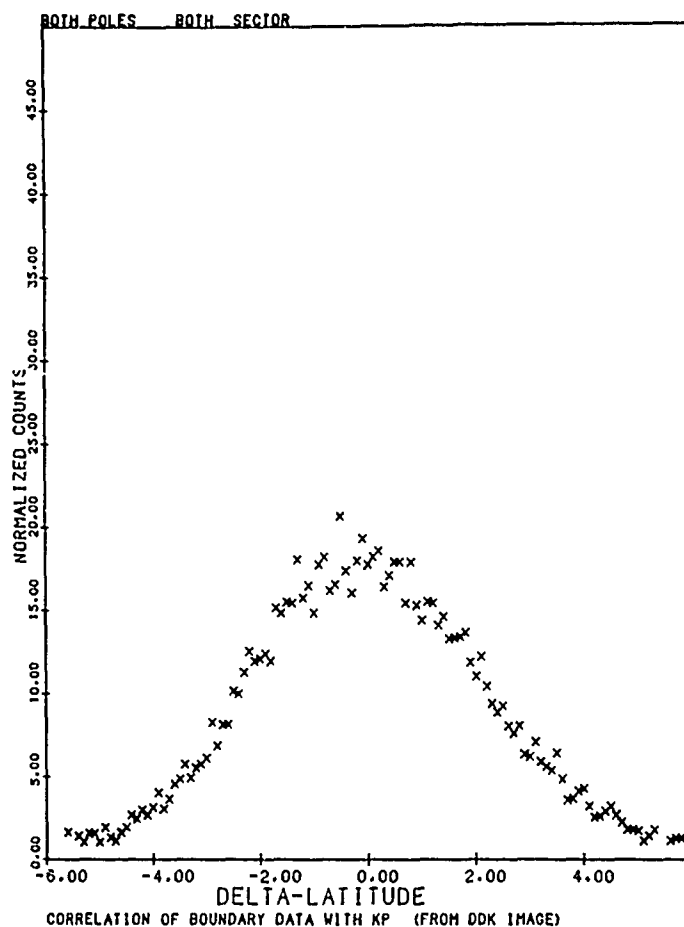


Figure 7. Distribution of the Residual Scatter in the Hand-chosen Boundary Set When Compared to Linear Regression Values Obtained From the Same Set. The distribution is accumulated in 0.1° bins and normalized to 1000 cases

process. Second, the distribution on the evening side of the oval is much narrower than on the morning side reflecting the more abrupt and therefore clearer onset of precipitation on the evening side. Lastly, the results are in very close agreement to those obtained by Hardy and MacKean⁹ which were derived using slightly different statistical tests.

We next analyze the source of differences between hand and computer boundaries that are greater than $\pm 3^\circ$ on the morning side and greater than $\pm 2^\circ$ on the evening side of the oval. The reasons for the larger differences between the hand-chosen and algorithm-chosen boundaries are given in Table 4. Morning and evening

sector discrepancies are listed separately because the number of cases differs. A discussion of these large differences in order of frequency of occurrence is given below.

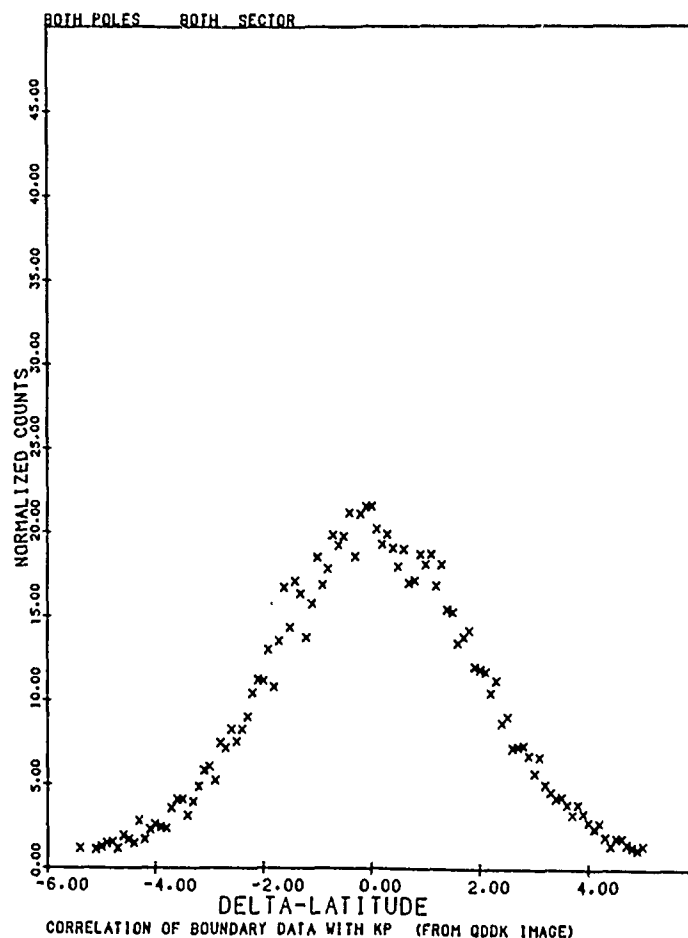


Figure 8. Distribution of the Residual Scatter in the Computer-chosen Boundary Set When Compared to Linear Regression Values Obtained From the Same Set. The distribution is accumulated in 0.1° bins and normalized to 1000 cases

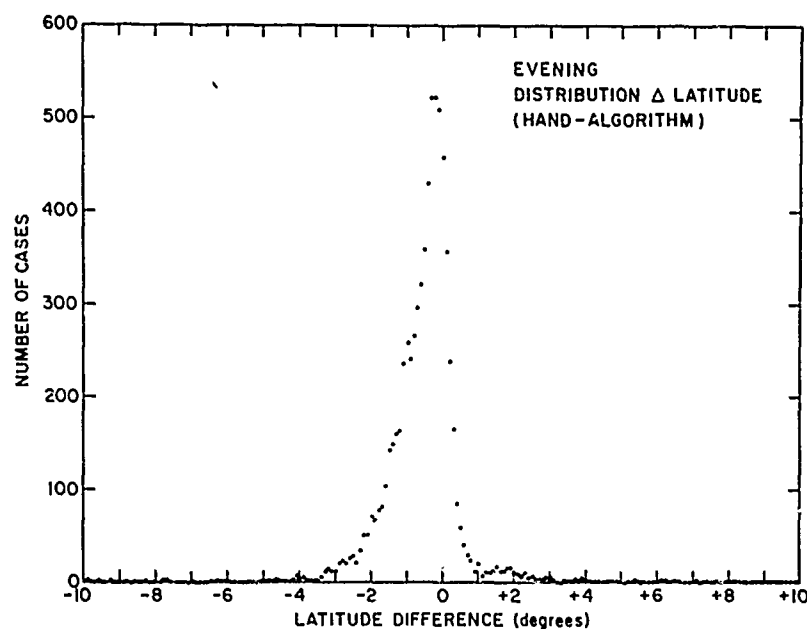


Figure 9. Distribution of the Differences Between Hand- and Computer-Chosen Boundaries ($\lambda_{II} - \lambda_A$) for the Evening Sector. The distribution is accumulated in 0.1° bins

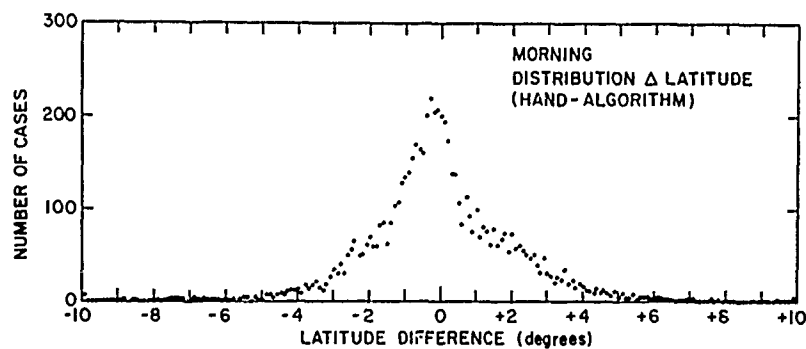


Figure 10. Same as Figure 9, for Morning Sector

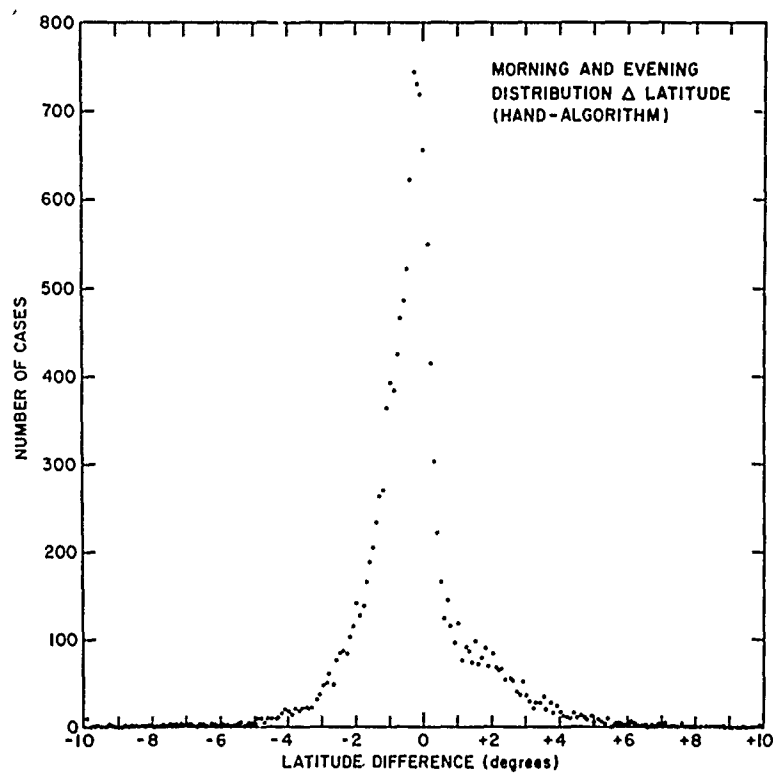


Figure 11. Same as Figure 9, for Evening and Morning Sectors Combined

Table 3. Percentages of Differences

	Evening	Morning	Composite	H-M Evening	H-M Morning
$\pm 1^\circ$	74%	50%	63%	80%	50%
$\pm 2^\circ$	93%	74%	84%	95%	67%
$\pm 3^\circ$	98%	89%	94%	99%	82%

Table 4. Hand- vs Algorithm-Chosen Boundaries

Morning			Evening		
Morning Discrepancies ($> \pm 3^\circ$ CGM)			Evening Discrepancies ($> \pm 2^\circ$ CGM)		
Reason	Number	% of Total Morning Boundaries Discrepancies	Reason	Number	% of Total Evening Boundaries Discrepancies
Radiation Belt Interference	241	3.8 (34.7)	Evening Ramp	303	4.3 (64.3)
Irregularities Equatorward Edge	241	3.8 (34.7)	Irregularities Equatorward Edge	66	0.9 (14.0)
Spurs	71	1.1 (10.2)	Spurs	36	0.5 (7.6)
Magnetic Local Noon Criteria	54	0.8 (7.8)	Radiation Belt Interference	29	0.4 (6.2)
Morning Ramps	28	0.4 (4.0)	Poleward Boundary	18	0.3 (3.8)
Minor Problems	59	0.9 (8.5)	Minor Problems:	19	0.3 (4.0)
1. Ambiguous (34)			1. Ambiguous (12)		
2. Algorithm Failure (13)			2. Algorithm Failure (2)		
3. Poleward Boundary (11)			3. Hand Error (5)		
4. Hand Error (1)					
Total Number of Morning Discrepancies $> \pm 3^\circ$:			Total Number of Evening Discrepancies $> \pm 2^\circ$:		
% of Total Morning Boundaries with $> 3^\circ$ CGM Discrepancy:			% of Total Evening Boundaries with $> 2^\circ$ CGM Discrepancy:		
(6398 Morning Boundaries Measured)			(7030 Evening Boundaries Measured)		
694			471		
10.8%			6.7%		

Evening ramps refer to the gradual onsets of precipitation in the evening sector. They occur in less than half of the passes and usually extend for less than half a degree in CGL. The onset of the evening ramps is chosen as the "better" boundary for the hand-chosen data set, but the algorithm tends not to pick up the onset of these evening ramps making the algorithm boundary closer to the 10^7 level. Referring to Table 4, it is seen that evening ramps account for nearly 2/3 of the $> \pm 2^\circ$ CGL discrepancies. Actually, because in these cases the hand boundary is lower than the computer boundary they fall only in the negative direction. Since evening ramps are generally smaller than 2° , it is possible to deduce that the small regions of gradual onset of precipitation on the evening side are a major cause of the slightly lower hand-chosen evening boundary, and the negative skew seen in Figure 9.

Large irregularities on or near the equatorward edge of both the morning or evening auroral oval occur primarily under three conditions: (a) the occurrence of polar cap absorption events, (b) very low activity, and (c) abrupt changes in the activity. Polar cap absorption events have been, as much as possible, edited out of both data sets because they totally obscure the onset of auroral precipitation. Figure 5 illustrates ambiguous conditions on the evening-side equatorward edge of the aurora. The dashed line is the hand-chosen boundary, the dot-dash line the computer-chosen boundary. As was mentioned in Section 3, spurs are excluded from the hand-chosen data set because they may be produced by the precipitation of trapped electrons from prior activity. The algorithm usually picks the auroral boundary below the spur if it is broad enough, as was the case in this example. The net effect on the evening side of the $> \pm 2^\circ$ irregularities is not significant in the distribution of differences shown in Figure 9, as 30 of the algorithm boundaries were lower and 33 of the hand boundaries were lower. However, this category of discrepancies can account for some of the very large differences between the two data sets.

Irregularities in the equatorward edge of the aurora produce a quite different net effect on the morning side. First, they account for more than half the $> \pm 3^\circ$ CGL discrepancies on the morning side. Second, there is a distinct bias in that for more than 210 of these cases, the computer boundary is lower than the hand boundary. This category, then, accounts for many of the $> + 3^\circ$ CGL differences in the distribution shown in Figure 10.

Radiation belt particles interfere with both morning and evening auroral boundaries. This accounts for ~30 percent of the large discrepancies on the morning side. (On the evening side the problem is minor, 0.4 percent of the large discrepancies, either because the sharp increase due to auroral precipitation is visible through the radiation belt signature or the generally higher latitude of the onset of auroral precipitation on the evening side produces a boundary above the latitude of particle radiation.) Radiation belt particle interference is a major problem in determining

equatorward auroral boundaries both by hand and with the computer and was discussed thoroughly in the previous sections. Although every attempt was made in both data sets to exclude radiation belt particles effects, it was not always successful. The effect is that the hand chosen boundaries in 200 of 270 cases where radiation particle effects are important, are lower than those chosen by the algorithm. On the morning side then, this category of discrepancy accounts for many of the $> -3^\circ$ CGL differences in the distribution shown in Figure 10.

The category labelled Spurs, in Table 4, results from the triggering of the algorithm test too early by regions of enhancement which in these cases are clearly outside the auroral oval. This category accounts for many of the largest differences between the algorithm- and hand-chosen boundaries in the positive direction in Figures 9, 10 and 11. This is an algorithm failure which occurs for about 0.8 percent of the boundaries in the total data set.

The area of the aurora around noon local time is confusing, as was discussed earlier. Whereas, the method used to choose boundaries in this region by hand is fairly clearly defined and consistent, algorithm tests often fail to pick up the irregular conditions of the diffuse aurora. Instead the "cusp" boundary is chosen. An attempt has been made to edit out the algorithm "cusp" boundaries. The cases appear in the listing as the hand-chosen boundaries with no corresponding algorithm boundary. There are also instances in the noon sector where the algorithm chose boundaries which were not evident in the particle data. Because DMSP/F2 is in a dusk-dawn orbit this is not a major problem. If a satellite in a noon-midnight orbit is used to produce future Auroral Boundary Index values, further work on both the algorithm and hand selection of boundaries in the noon sector will be needed.

The remaining categories of large discrepancies between the two data sets are minor problems. The total number of boundaries in these additional cases accounts for less than 1 percent of the total boundary measurements. Morning ramps, which are a major problem in determining boundaries by hand, cause very few large discrepancies between the two data sets unlike their evening counterparts. Briefly, the other minor problems are: Poleward boundaries, the result of the algorithm tests being triggered very late (at or near the poleward edge of the aurora) because the gradient is very smooth; Ambiguous, where the reason for the discrepancy is a combination of two or more categories; Algorithm Failure, where the algorithm is wrong, but the reason is unclear; and Hand Errors, two of which were ephemeris interpolation errors, and the rest recording mistakes.

6. AURORAL BOUNDARY INDEX

A proposed Auroral Boundary Index was constructed in the following manner. First, using values of α and β from Table 1 a predicted Kp, called Kp', was calculated for each measured equatorward auroral boundary, λ_E , based on the relationship of λ and Kp shown in Eq. (1), using the following expression:

$$Kp' \equiv \frac{\lambda_E - \alpha_i}{\beta_i} . \quad (2)$$

Here α_i and β_i are the intercept and slope for the MLT zone in which the boundary was measured.

Second, using the Kp' calculated in Eq. (2), λ_{EM}' , the projection of λ_E to the midnight (23-24) MLT sector, was calculated using the expression:

$$\lambda_{EM}' = \alpha_M + \beta_M Kp' , \quad (3)$$

where α_M and β_M are the intercept and slope for 23-24 MLT zone. The last two columns in computer listing in Appendix B give the values of λ_{EM}' for the hand- and computer-chosen values of λ_E , respectively. Software has been developed to generate monthly plots of Kp', 3 hour averages of Kp' (\overline{Kp}'), and λ_{EM}' for both the hand- and algorithm-chosen boundaries. Additionally, the derived quantities are plotted using all points and using morning or evening boundaries separately. A sample set of plots of \overline{Kp}' and λ_{EM}' for March 1978 is shown in Figures 12a-12l.

As the final part of the development of the index we have correlated Kp with \overline{Kp}' for both hand- and algorithm-boundaries. The correlation was done using values of \overline{Kp}' derived from the morning sector boundaries, evening sector boundaries, and all boundaries. Table 5 shows the correlations of Kp vs \overline{Kp}' for each month in 1978. It is clear from Table 5 that correlations are best using only the evening boundaries (average of 0.84, hand and algorithm) and still quite good for the combined morning and evening boundary set (average of 0.84, hand, and 0.82, algorithm). The poorest correlations result when only morning boundaries are used (average of 0.77, hand, and 0.72, algorithm), a reflection of the morning problems. The lowest correlations generally occur in those months where there are very few active periods resulting in a restricted range for the data. Scatter plots of Kp vs of \overline{Kp}' for March 1978, are given in Figures 13a-13f. Straight lines show the results of performing linear regressions on Kp vs \overline{Kp}' and \overline{Kp}' vs Kp.

In order to assess the consistency between the hand-chosen and algorithm-chosen data sets, monthly regressions of $\overline{Kp'}$ derived from the hand-chosen boundaries on $\overline{Kp'}$ derived from the algorithm-chosen boundaries were calculated. The results of these regressions for March 1978 are shown in Figure 14. Average correlation coefficients of $\overline{Kp'}$ (hand) vs $\overline{Kp'}$ (algorithm) are 0.97 for evening values, 0.91 for morning values and 0.96 for combined values.

Table 5. Correlations of Kp vs $\overline{Kp'}$

1979	Algorithm Kp' M/E	Algorithm Kp' Evening	Algorithm Kp' Morning	Hand Kp' M/E	Hand Kp' Evening	Hand Kp' Morning
Jan	0.87	0.86	0.80	0.89	0.86	0.85
Feb	0.74	0.78	0.64	0.77	0.77	0.66
Mar	0.81	0.84	0.73	0.83	0.84	0.75
Apr	0.81	0.83	0.70	0.84	0.84	0.76
May	0.85	0.87	0.77	0.88	0.87	0.84
Jun	0.78	0.81	0.67	0.77	0.80	0.66
Jul	0.76	0.78	0.68	0.79	0.79	0.73
Aug	0.86	0.87	0.83	0.89	0.89	0.83
Sep	0.87	0.89	0.76	0.89	0.90	0.83
Oct	0.78	0.81	0.66	0.80	0.82	0.73
Nov	0.85	0.86	0.74	0.87	0.87	0.81
Dec	0.83	0.84	0.73	0.86	0.86	0.79

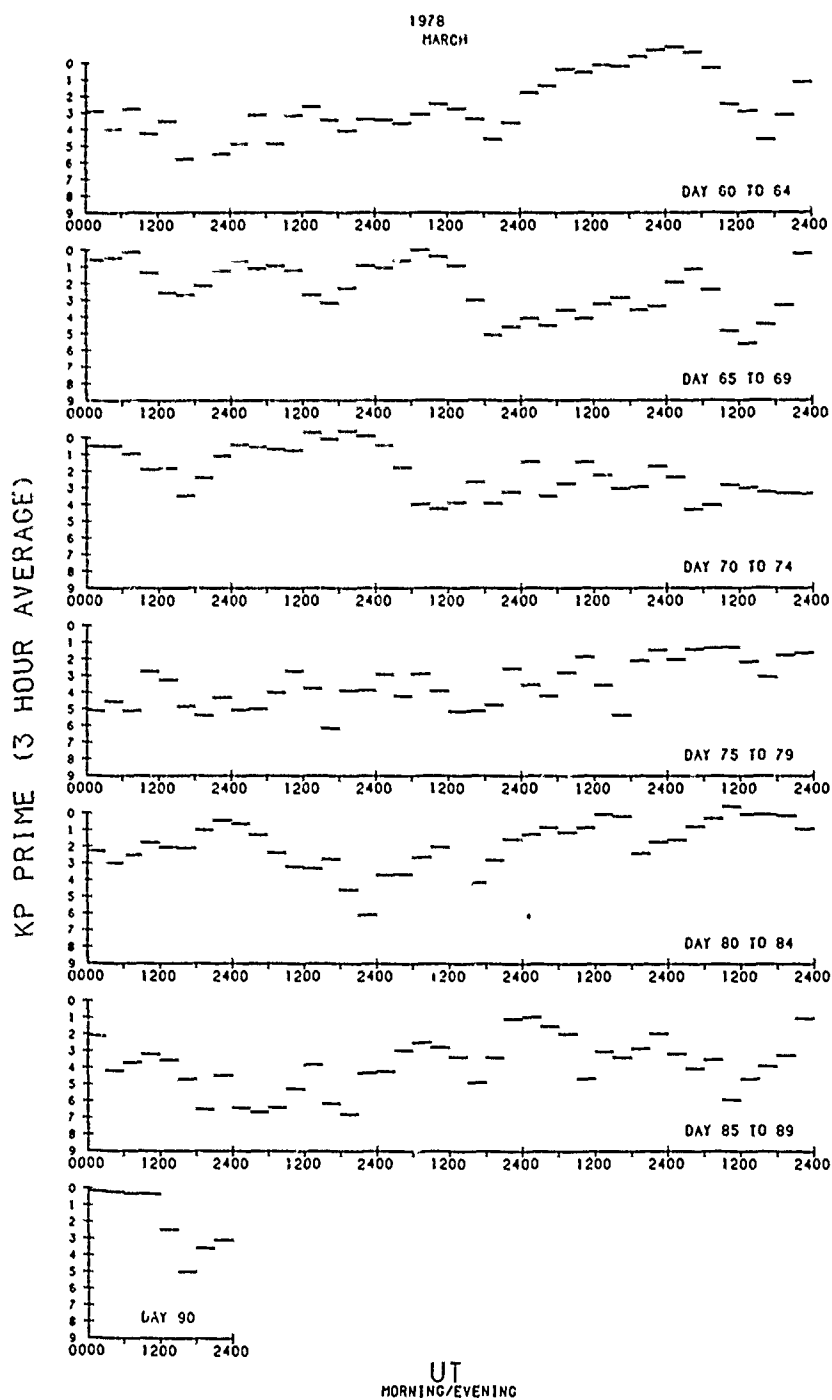


Figure 12a. Three-hour Average of K_p' Calculated From Hand-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978

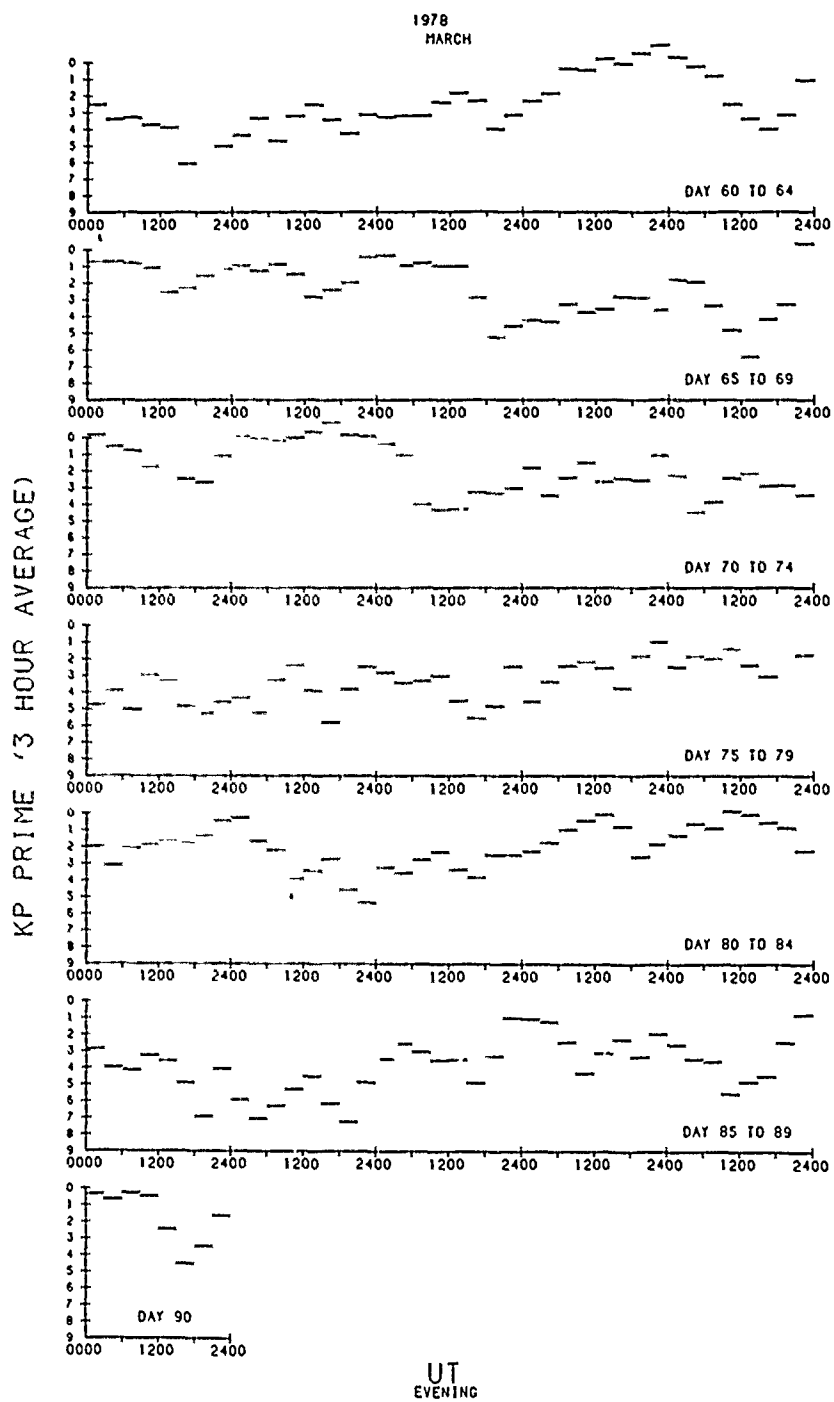


Figure 12b. Same as Figure 12a, Using Only Evening Boundaries

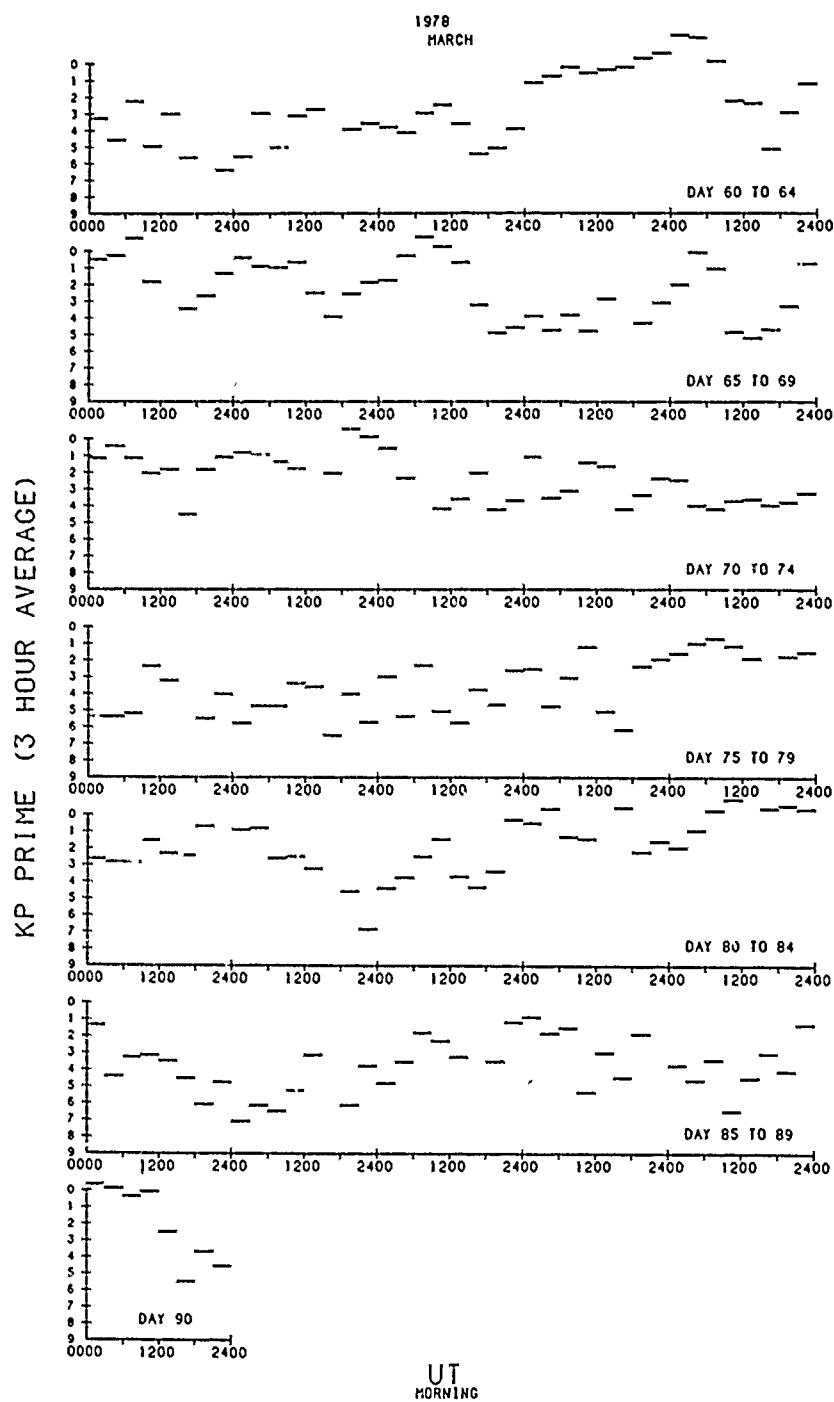


Figure 12c. Same as Figure 12a, Using Only Morning Boundaries

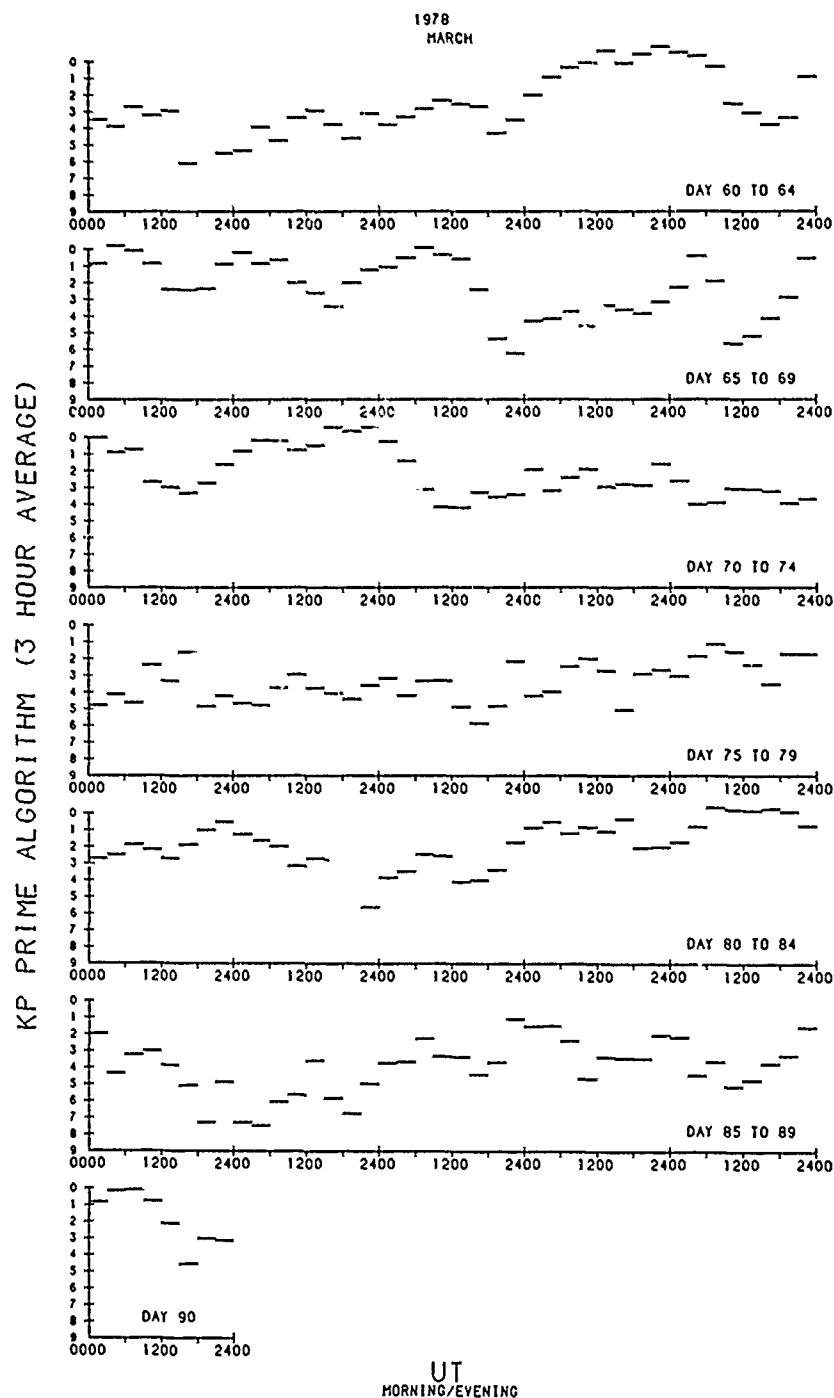


Figure 12d. Three-hour Average of K_p' Calculated From Algorithm-chosen Morning and Evening Equatorward Auroral Boundaries Plotted as a Function of Universal Time for March 1978

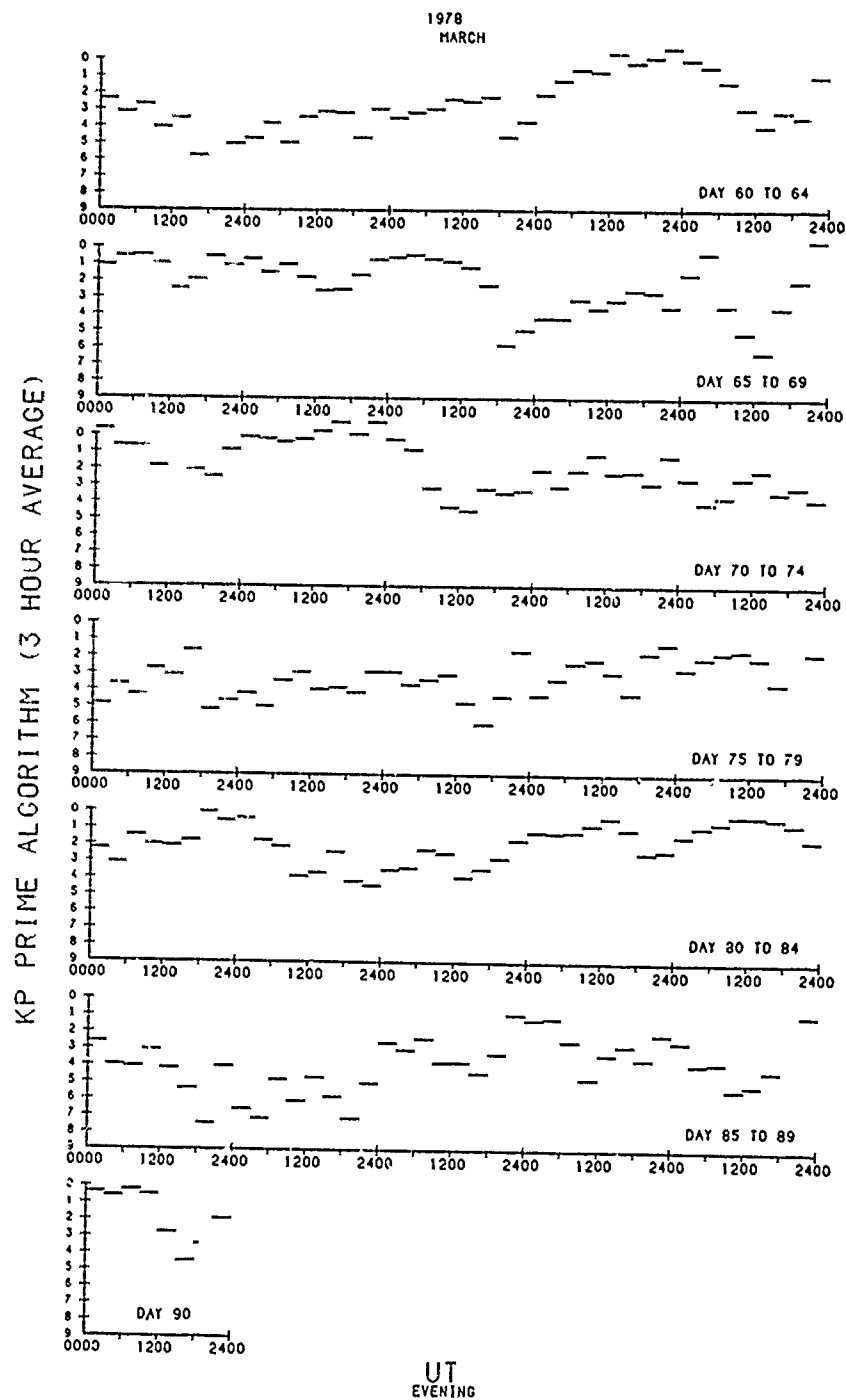


Figure 12e. Same as Figure 12d, Using Only Evening Boundaries

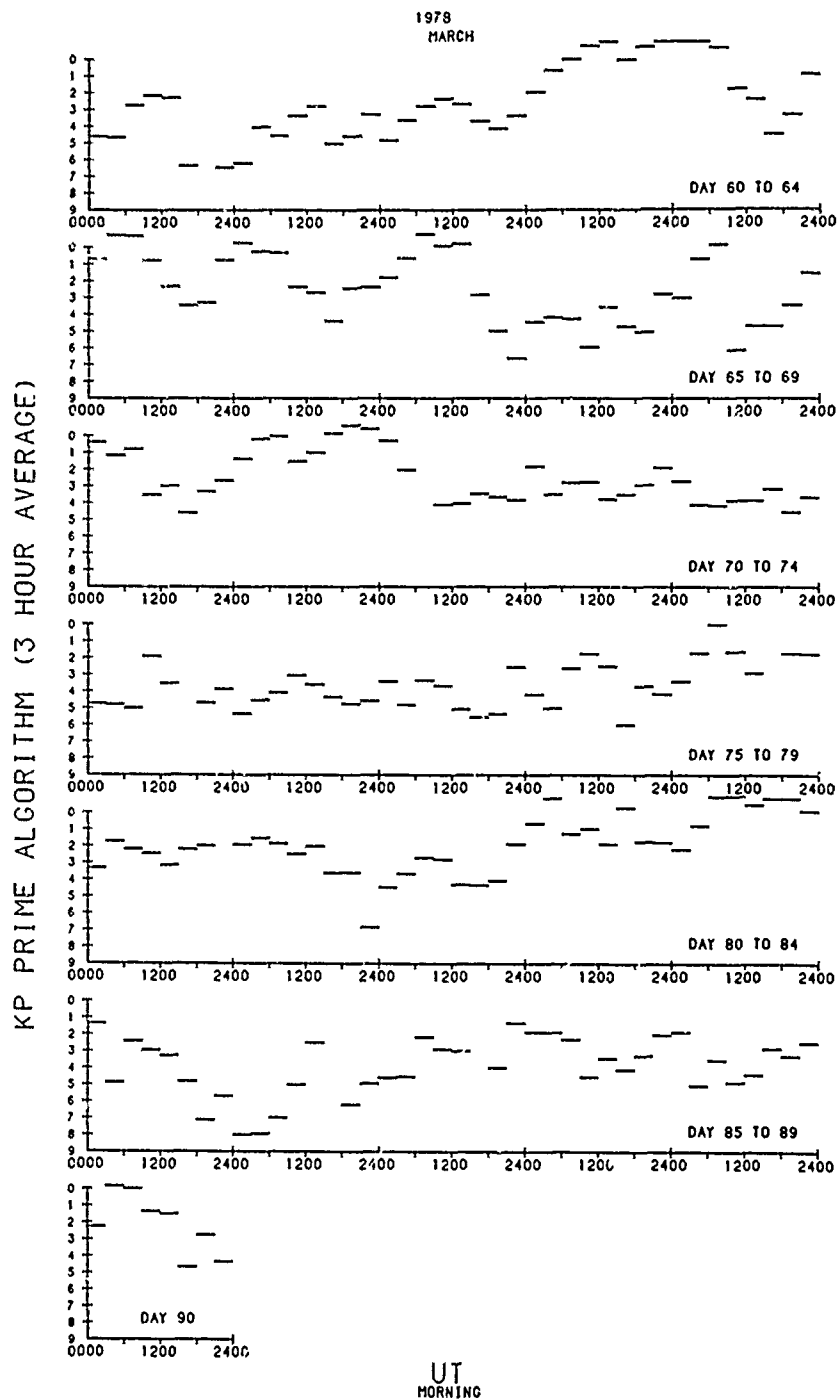


Figure 12f. Same as Figure 12d, Using Only Morning Boundaries

1978
MARCH

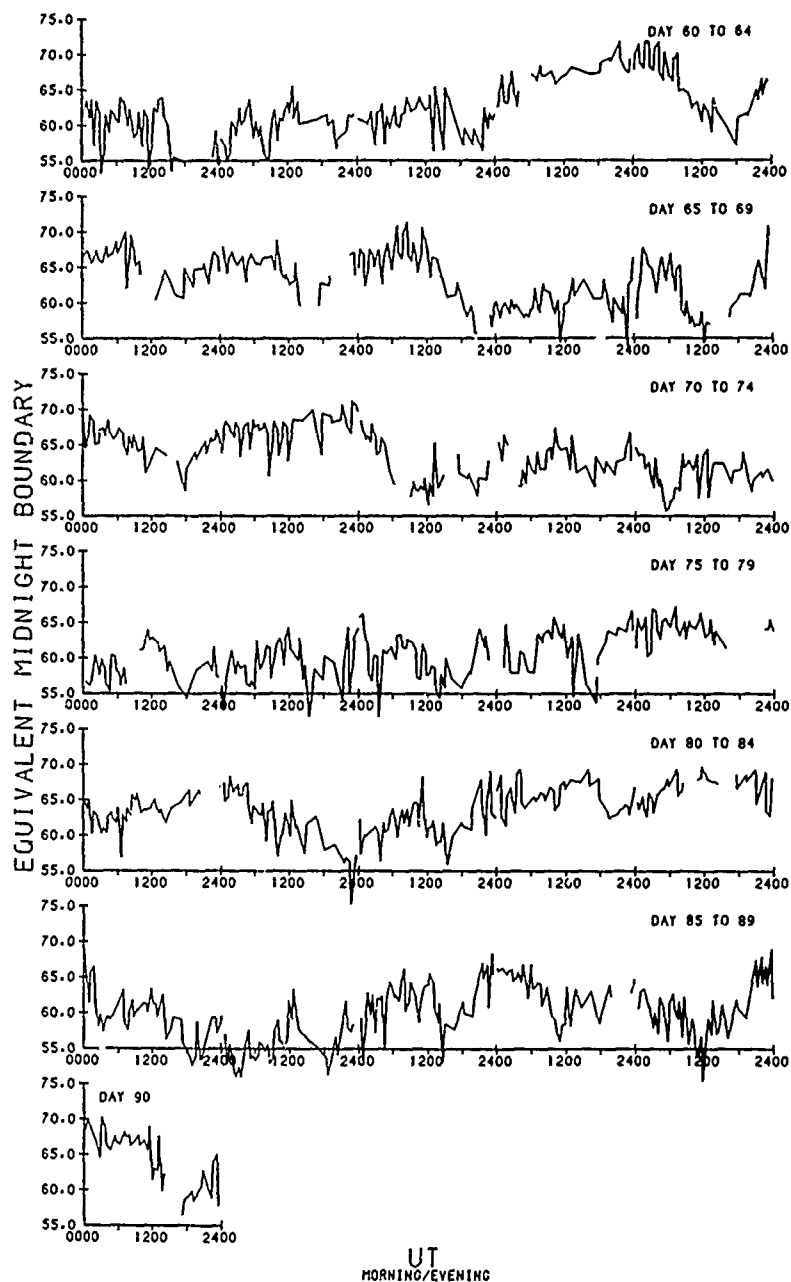


Figure 12g. Equivalent Midnight Boundary Calculated From Hand-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978

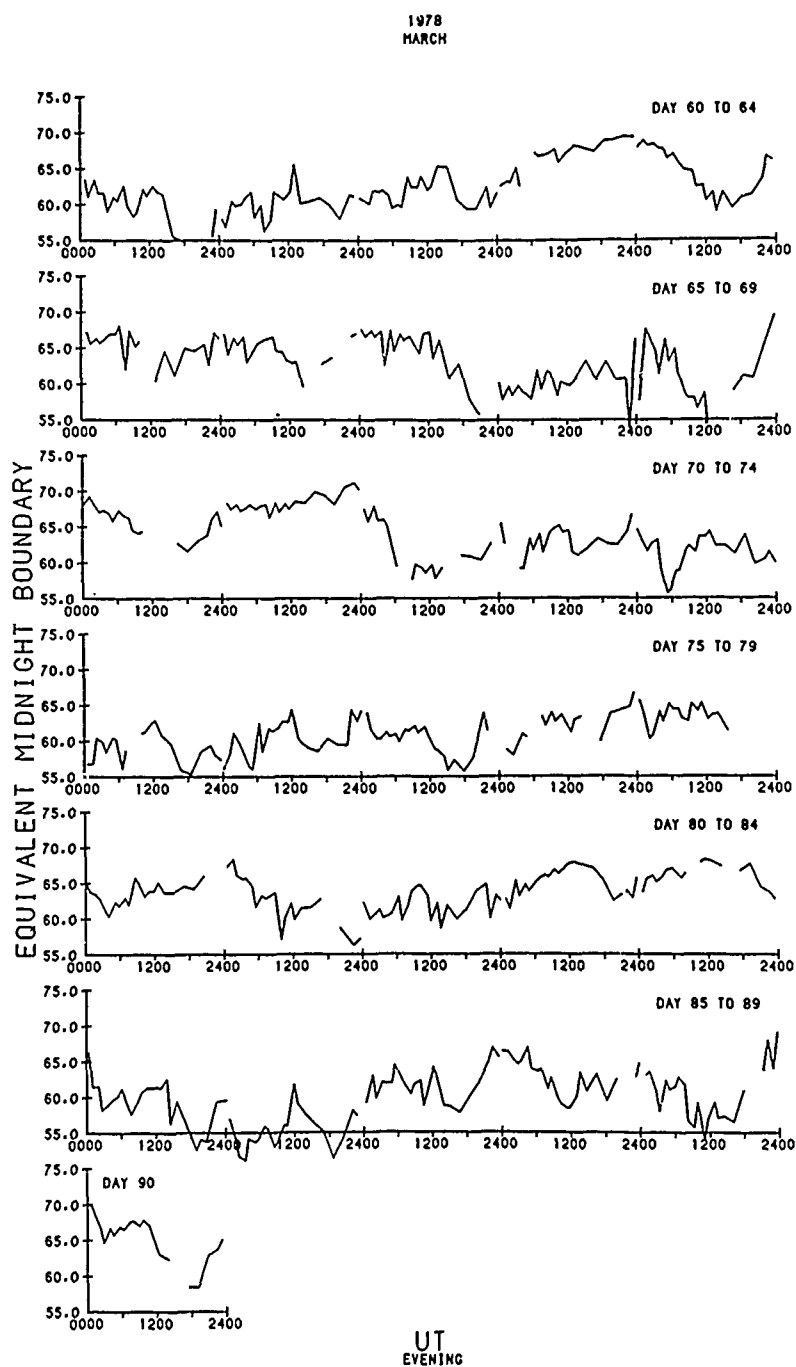


Figure 12h. Same as Figure 12g, Using Only Evening Boundaries

1978
MARCH

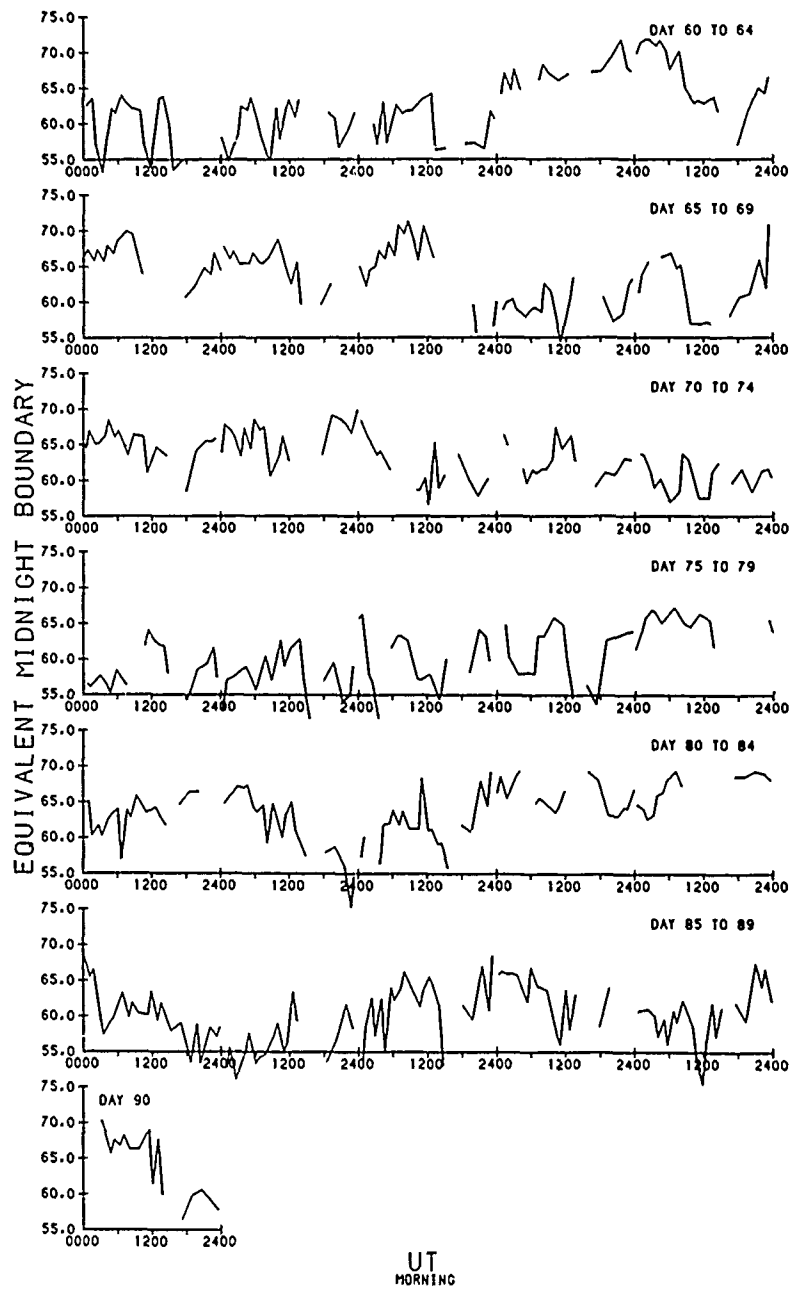


Figure 12i. Same as Figure 12g, Using Only Morning Boundaries

1978
MARCH

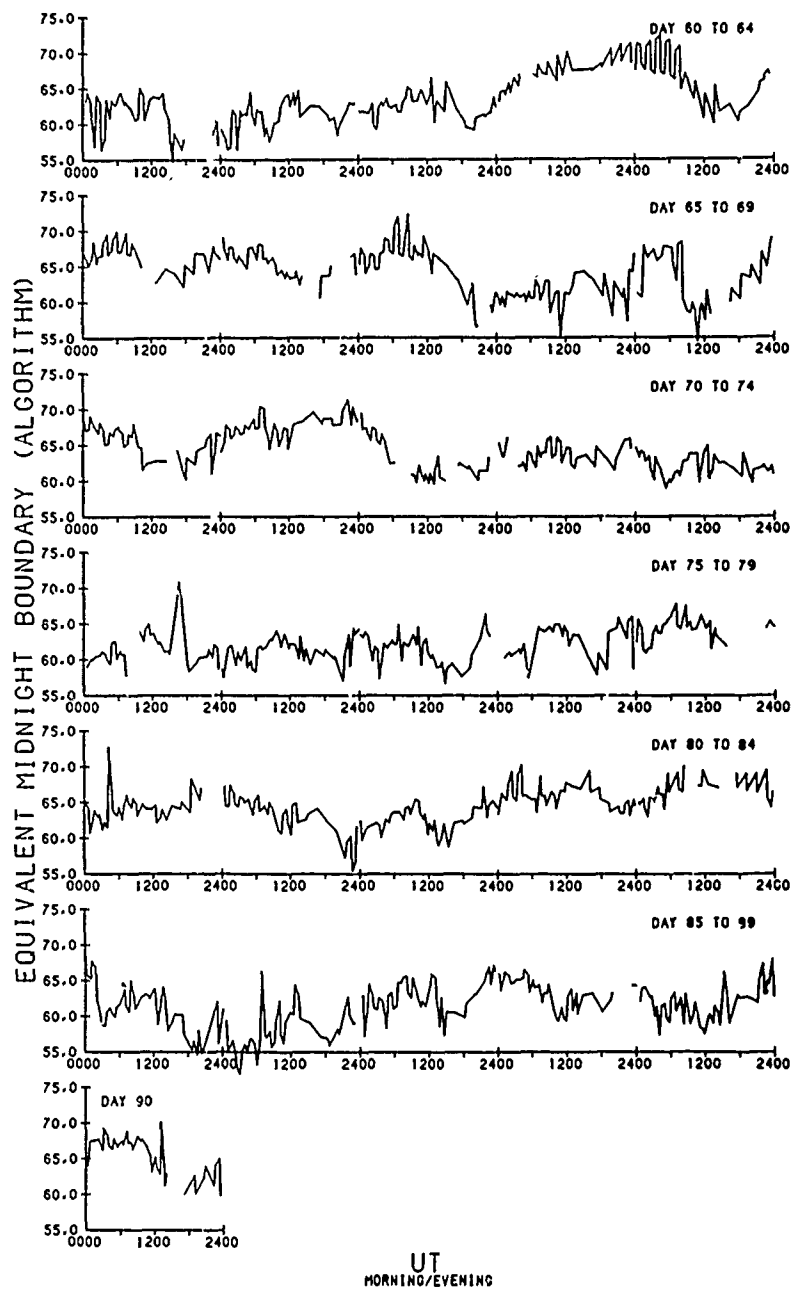


Figure 12j. Equivalent Midnight Boundary Calculated From Algorithm-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978

1978
MARCH

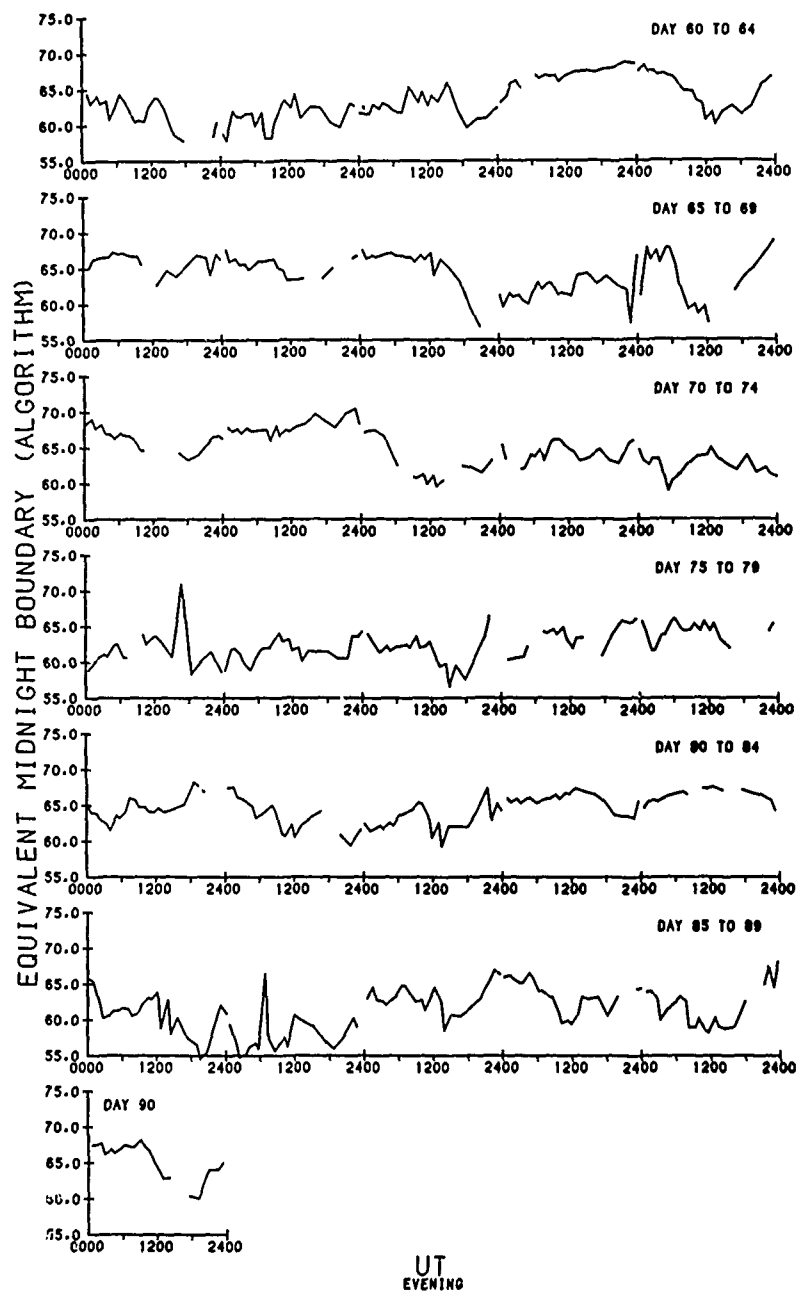


Figure 12k. Same as Figure 12j, Using Only Evening Boundaries

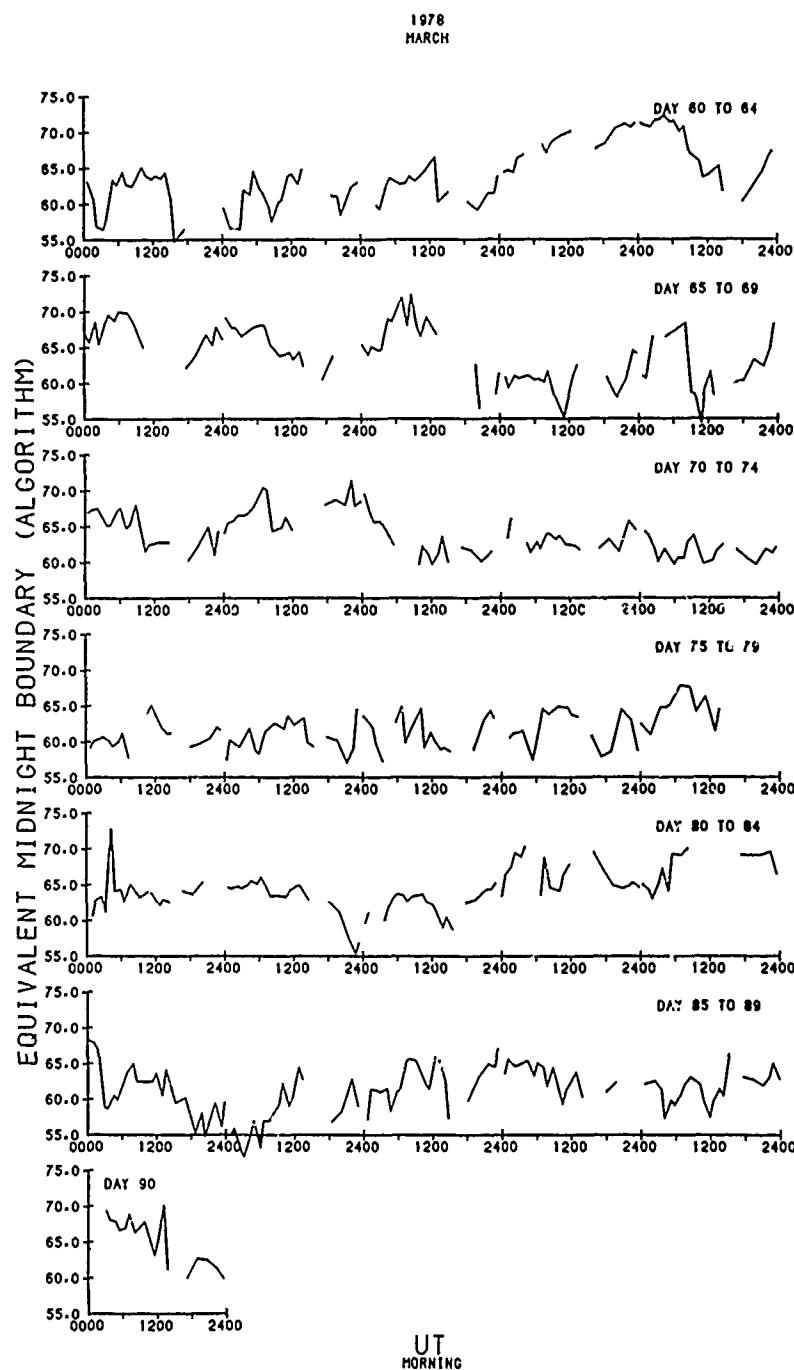


Figure 12l. Same as Figure 12j, Using Only Morning Boundaries

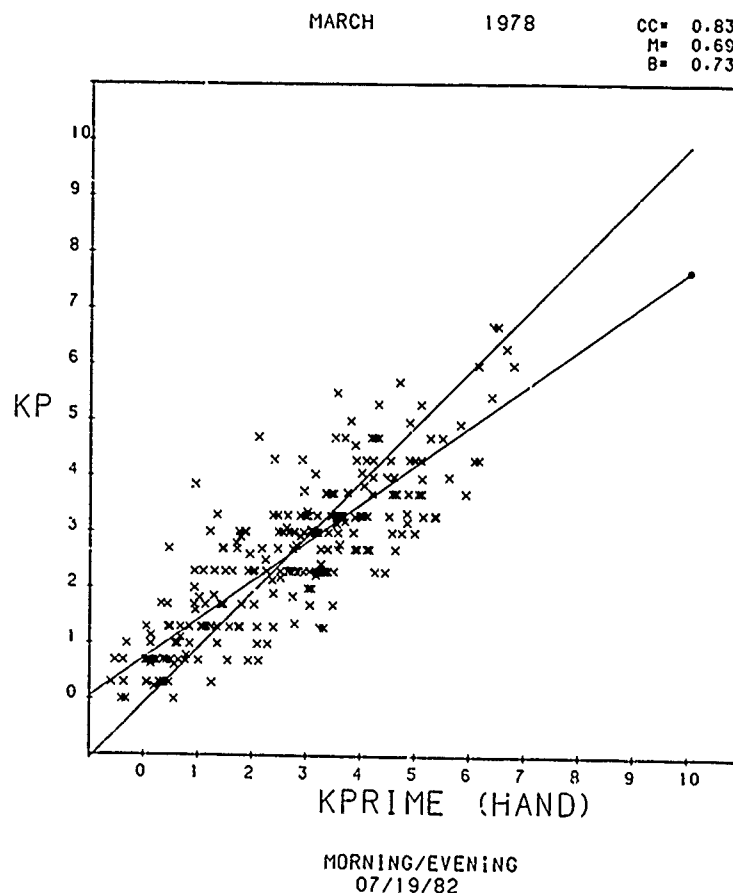
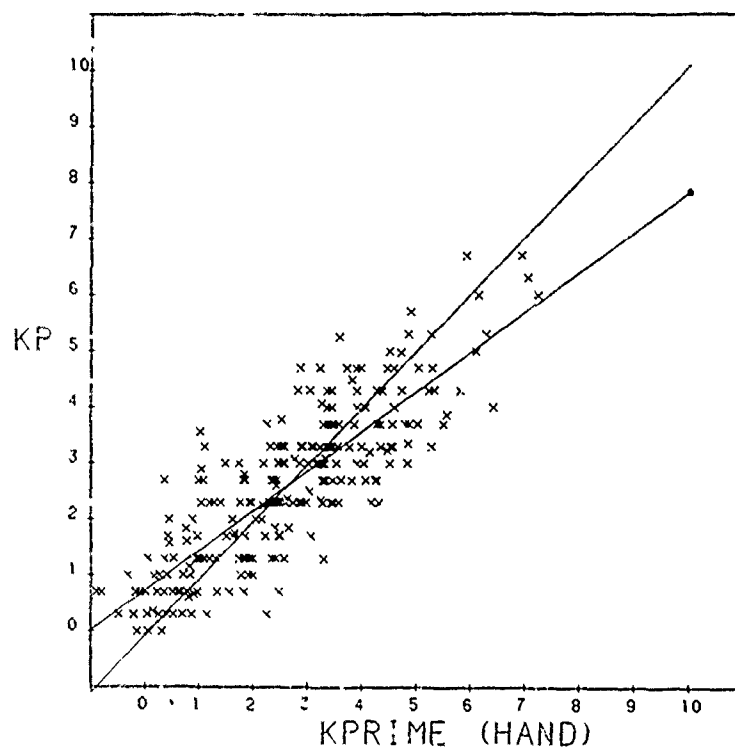


Figure 13a. Scatter Plot of the Values of Kp vs the Corresponding Three-hour Average Value of Kp' (labelled KPRIME) When Kp' is Calculated Using Hand-chosen Morning and Evening Equatorward Auroral Boundaries Obtained in March 1978. The result of performing a linear regression of Kp (Kp') vs Kp' (Kp) is shown by the straight line ending in a dot (not ending in a dot). The correlation coefficient, slope and intercept of the Kp vs Kp' line are shown in the upper right hand corner

MARCH

1978

CC= 0.84
M= 0.71
B= 0.72



EVENING
07/19/82

Figure 13b. Same as Figure 13a, Using Only Values of Kp'
Determined From Evening Boundaries

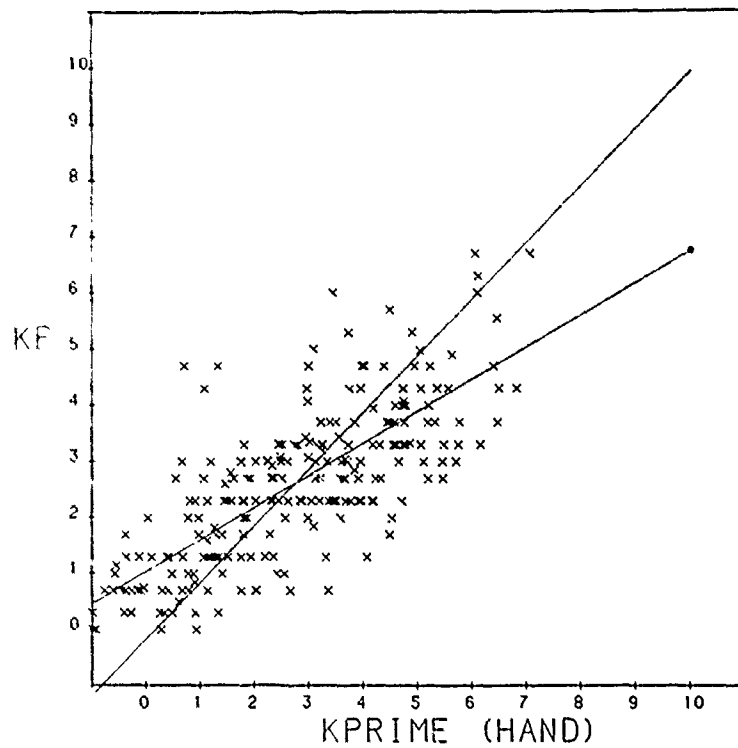
MARCH

1978

CC= 0.75

H= 0.57

B= 1.03



MORNING
07/19/82

Figure 13c. Same as Figure 13a, Using Only Values of Kp' Determined From Morning Boundaries

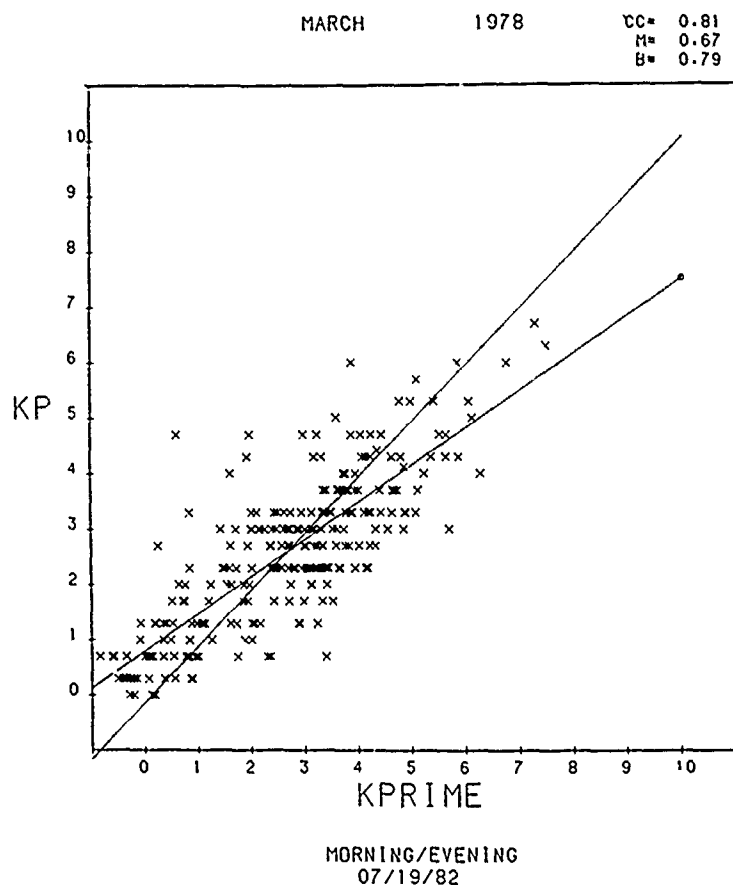
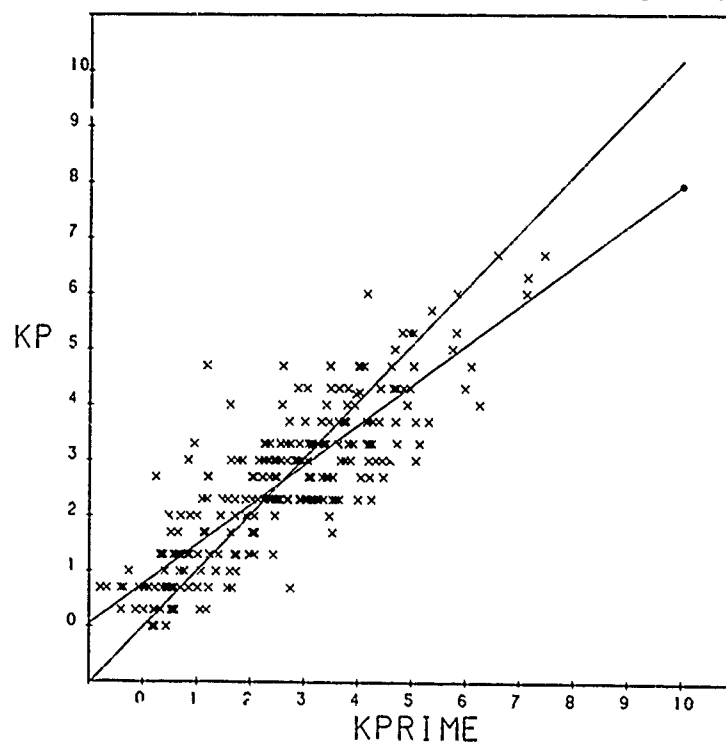


Figure 13d. Scatter Plot of the Values of Kp vs the Corresponding Three-hour Average Value of Kp' (labelled KPRIME) When Kp' is Calculated Using Computer-chosen Morning and Evening Equatorward Auroral Boundaries Obtained in March 1978. The result of performing a linear regression of Kp (Kp') vs Kp' (Kp) is shown by a straight line ending in a dot (not ending in a dot). The correlation coefficient, slope and intercept of the Kp vs Kp' line are shown in the upper right hand corner

MARCH

1978

CC= 0.84
H= 0.72
B= 0.76



EVENING
07/19/82

Figure 13e. Same as Figure 13d, Using Only Values of Kp'
Determined From Morning Boundaries

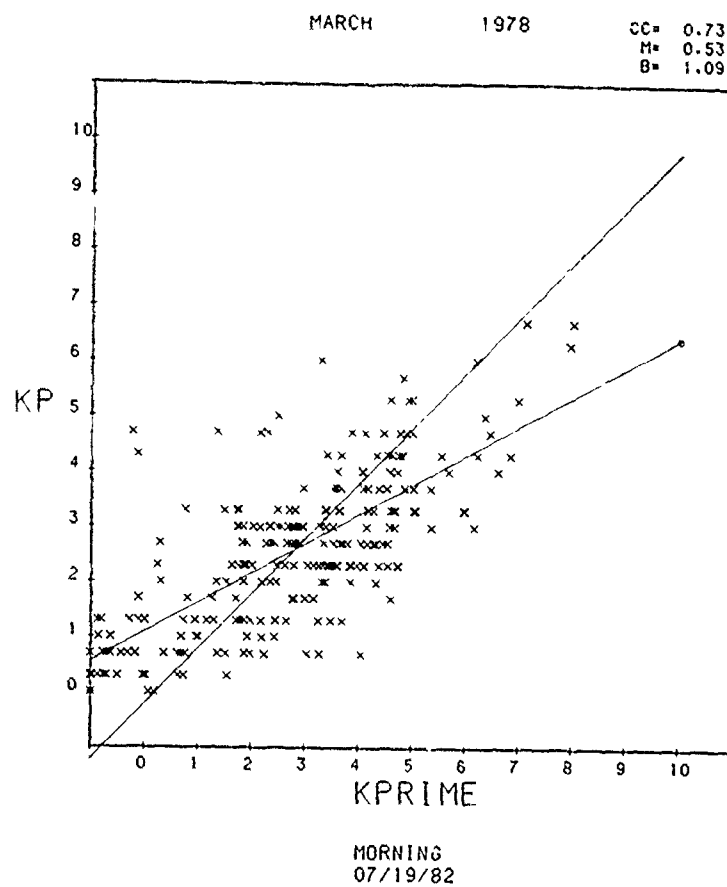


Figure 13f. Same as Figure 13d, Using Only Values of Kp' Determined From Morning Boundaries

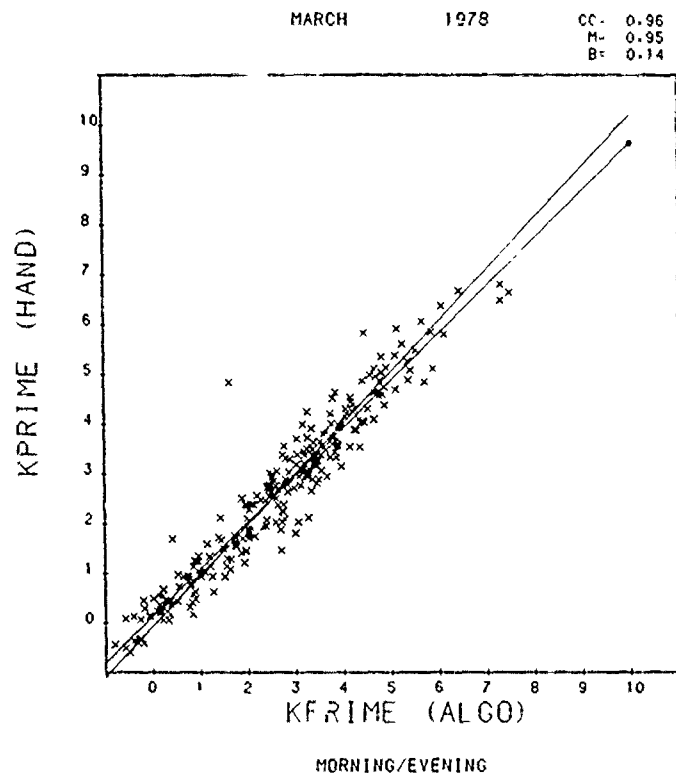


Figure 14. Scatter Plot of the Corresponding Values of Three-hour Averages of Kp' Calculated Using Hand-chosen [labelled KPRIME (HAND)] and Algorithm-chosen [labelled KPRIME (ALGO)] Morning and Evening Equatorward Boundaries Obtained in March 1978. The result of performing a linear regression of Kp' (hand) [Kp' (algorithm)] vs Kp' (algorithm) [Kp' (hand)] is shown by the straight line ending in a dot [not ending in a dot]. The correlation coefficient, slope and intercept of the Kp' (hand) vs Kp' (algorithm) line are shown in the upper right hand corner

7. DISCUSSION

Before making a comparison of the two sets of 1978 auroral equatorward boundaries, those laboriously done by hand and those done by a rather complex computer algorithm, we list the following overall conclusions:

- (a) The boundaries cannot be judged absolutely. There is a margin of ambiguity in all but the most abrupt and clean evening side rises of precipitating electron counts above background. In most cases the margin of ambiguity is small.

(b) The evening boundaries have a much smaller margin of ambiguity than the morning boundaries. Characteristically the morning electron precipitation onset is different from that of the evening, having long ramps and more irregularities. This may well reflect a difference in the dynamics of the plasma sheet at different local times and/or a difference in precipitation mechanisms. The evening boundaries also have higher correlation coefficients than the morning boundaries, when directly related to Kp.

(c) Contamination of the auroral electron signal by radiation belt particles presents the single greatest problem in choosing equatorward boundaries by both methods. Again, this is particularly true on the morning side. To avoid this problem on future DMSP flights additional shielding has been added to the detectors.

Since one of the objects of this study is an assessment of the algorithm developed by Hardy and Holeman⁸ for choosing boundaries we make the following additional conclusions from comparing the two boundary sets:

(d) Both hand- and computer-chosen boundary sets have approximately the same internal consistency. The spread in boundary values from the linear regression values are very similar (Figures 7 and 8).

(e) Although the two sets of boundaries result in different linear regressions (systematically differing slopes and intercepts) they correlate equally well with Kp (Table 1).

(f) The two boundary sets show similar discrepancies between morning and evening boundaries, the latter being more consistent both within and between boundary sets and having high correlation with Kp.

(g) When used as a predictor of Kp (using the three-hour averaged values of Kp') the accuracy of the two sets is indistinguishable when the evening boundaries are used, and is only slightly better for hand-chosen boundaries using morning and combined values (Table 5). This is clearly shown in Figure 14 in which the two predicted values agree with a correlation coefficient of 0.96.

We therefore conclude that the auroral equatorward boundaries selected by the algorithm described here may be used for both scientific and predictive purposes in place of the hand-chosen boundaries. The algorithm was developed and tested for dawn and dusk boundaries and is not applicable in the noon sector.

Finally, we use the auroral equatorward boundaries as a measure of auroral activity by indexing the activity with the boundary measurements. Using the algorithm for choosing boundaries at the site of the down-link data transmission without intermediate processing can give the index in near real time. The most direct index is simply the boundary itself, tagged by both universal and local time. The large offset of the auroral oval in magnetic coordinates toward higher latitudes at noon and lower latitudes at midnight, makes the use of multi-local time values of

the boundary difficult at best, and no doubt misleading to casual users. We therefore choose to scale each boundary to an equivalent midnight boundary by way of the derived $Kp = Kp'$. Kp' is not used as the index for two reasons: (a) the index is derived from boundaries, not from magnetic activity. The source of the index is obscured by using Kp' . (b) The boundary measurements have a finer time resolution, and one more appropriate to substorm activity than the 3-hr Kp interval. A finer Kp' resolution would again add confusion in interpretation.

Another choice remains. The equivalent midnight, λ_{EM}' used for the index can be derived from both morning and evening boundaries, or either morning or evening boundaries. Plots of the combined data (Figure 12g) have better time resolution, but contain a great deal of variation from point to point (oscillating from a morning to an evening equivalent boundary). These variations result either from the poorer quality of morning boundary choices and/or from a real difference in the particle dynamics between the two local time sectors. Because the evening boundary set has fewer and more controllable selection problems, is more internally consistent, and correlates more directly with Kp , we choose the equivalent midnight boundary obtained from the evening sector boundary set (Figure 12h) as the Auroral Boundary Index. To reiterate, the Auroral Boundary Index is the projected midnight equatorward auroral boundary found using an actual evening sector boundary and the statistically determined systematic local time variation of the oval. During periods of good data accumulation there will be one index value each 55 min. The Auroral Boundary Index is presented month by month for 1978 in Appendix A.

References

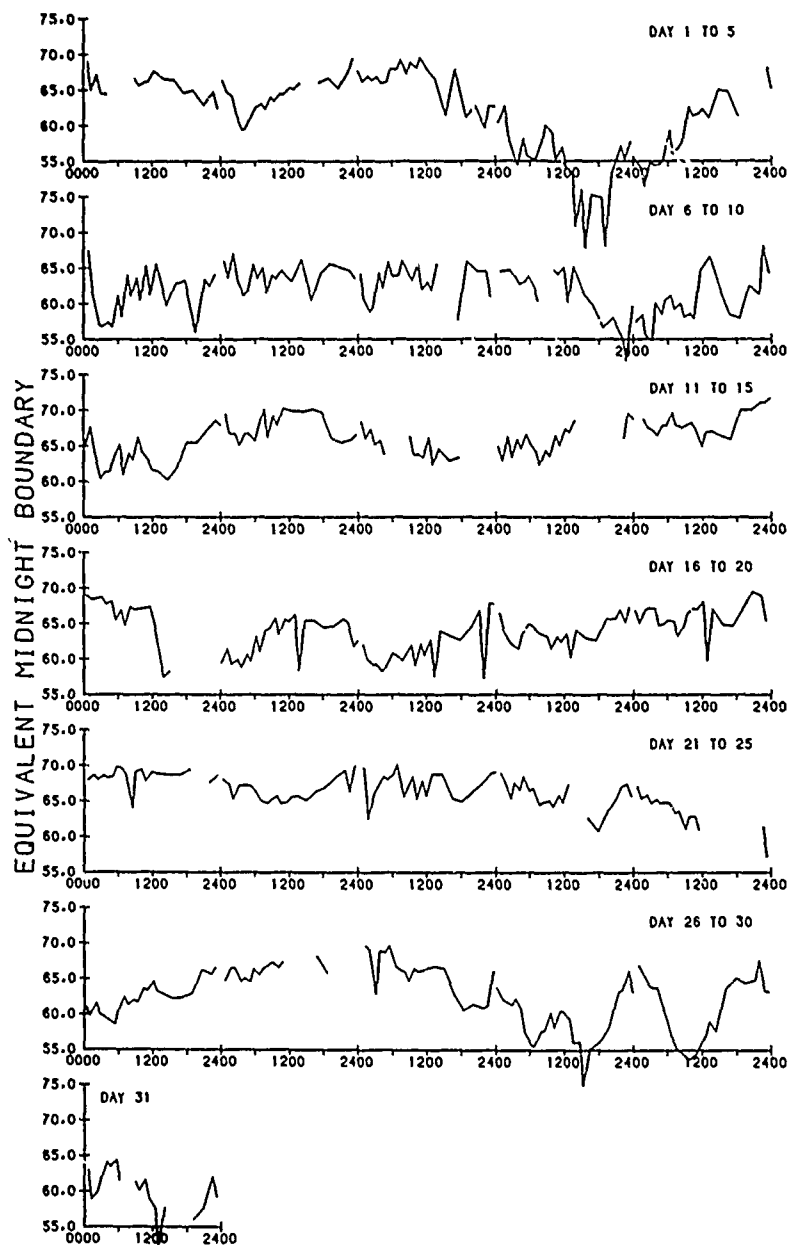
1. Lui, A.T.Y., Anger, C.D., and Akasofu, S.-I. (1975) The equatorward boundary of the diffuse aurora and auroral substorms as seen by the ISIS-2 auroral scanning photometer, J. Geophys. Res. 80:3603.
2. Meng, C.-I., Holzworth, R.H., and Akasofu, S.-I. (1977) Auroral circle delineating the poleward boundary of the quiet auroral oval, J. Geophys. Res. 82:164.
3. Kamide, Y., and Winningham, J.D. (1977) A statistical study of the 'instantaneous' nightside auroral oval. The equatorial boundary of electron precipitation as observed by the ISIS 1 and 2 satellites, J. Geophys. Res. 82:5573.
4. Sheehan, R.E., and Carovillano, R.L. (1978) Characteristics of the equatorward auroral boundary near midnight determined from DMSP images, J. Geophys. Res. 83:4749.
5. Slater, D.W., Smith, L.L., and Kleckner, E.W. (1980) Correlated observations of the equatorward diffuse auroral boundary, J. Geophys. Res. 85:531.
6. Gussenhoven, M.D., Hardy, D.A., and Burke, W.J. (1981) DMSP/F2 electron observations of equatorward auroral boundaries and their relationship to magnetospheric electric fields, J. Geophys. Res. 86:768.
7. Hardy, D.A., Burke, W.J., Gussenhoven, M.S., Heinemann, N., and Holeman, E. (1981) DMSP/F2 electron observations of equatorward auroral boundaries and their relationship to the solar wind velocity and the north-south component of the interplanetary magnetic field, J. Geophys. Res. 86:9961.
8. Hardy, D.A., and Holeman, E. (1983) The Global Auroral Boundary Code for the Global Weather Central of the Air Weather Service (to be published).
9. Hardy, D.A. and MacKean, R. (1980) An Algorithm for Determining the Boundary of Auroral Precipitation Using Data from the SSJ/3 Sensor, AFGL-TR-80-0028, AD A084482.
10. Hardy, D.A., Gussenhoven, M.S., and Huber, A. (1979) The Precipitating Electron Detectors (SSJ/3) for the Block 5D/Flights 2-5 DMSP Satellites: Calibration and Data Presentation, AFGL-TR-79-0210, AD A083136.

Appendix A

Auroral Boundary Index

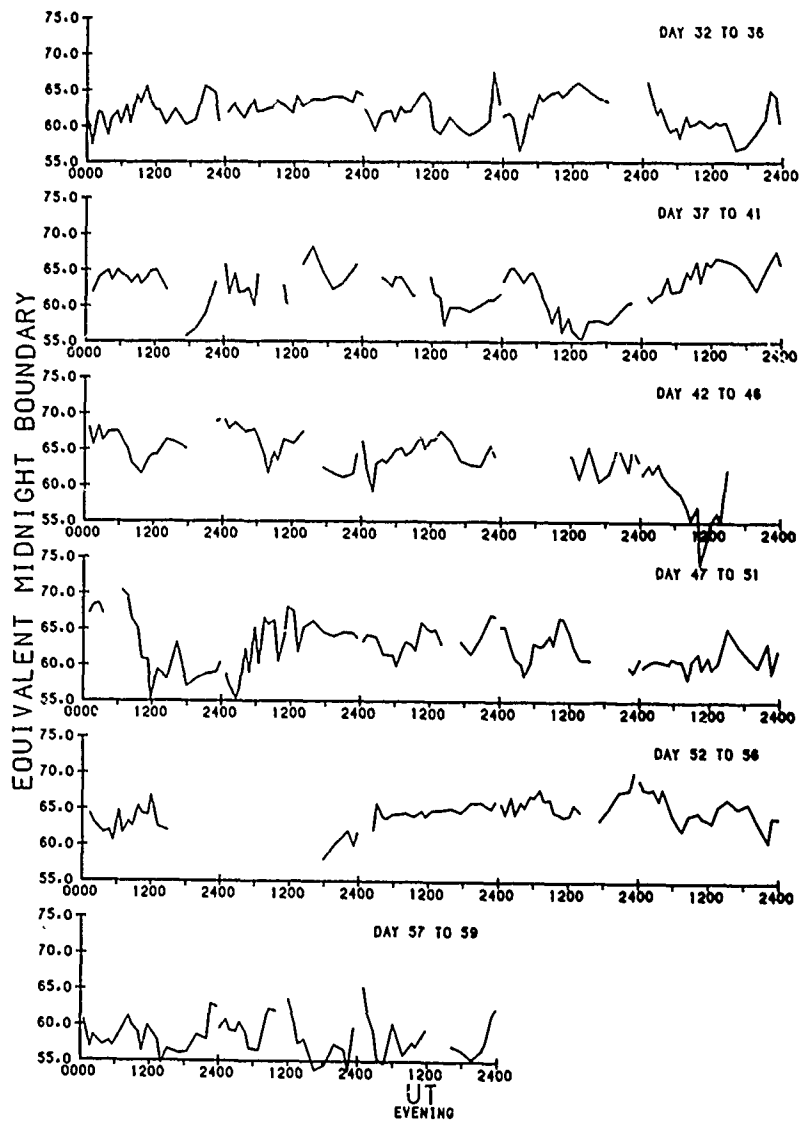
Each value of the Auroral Boundary Index is a projected midnight equatorward auroral boundary found using an actual evening sector boundary and the statistically determined systematic local time variation of the auroral oval. The Index is presented in the following pages as a function of universal time, by month, for 1978.

1978
JANUARY

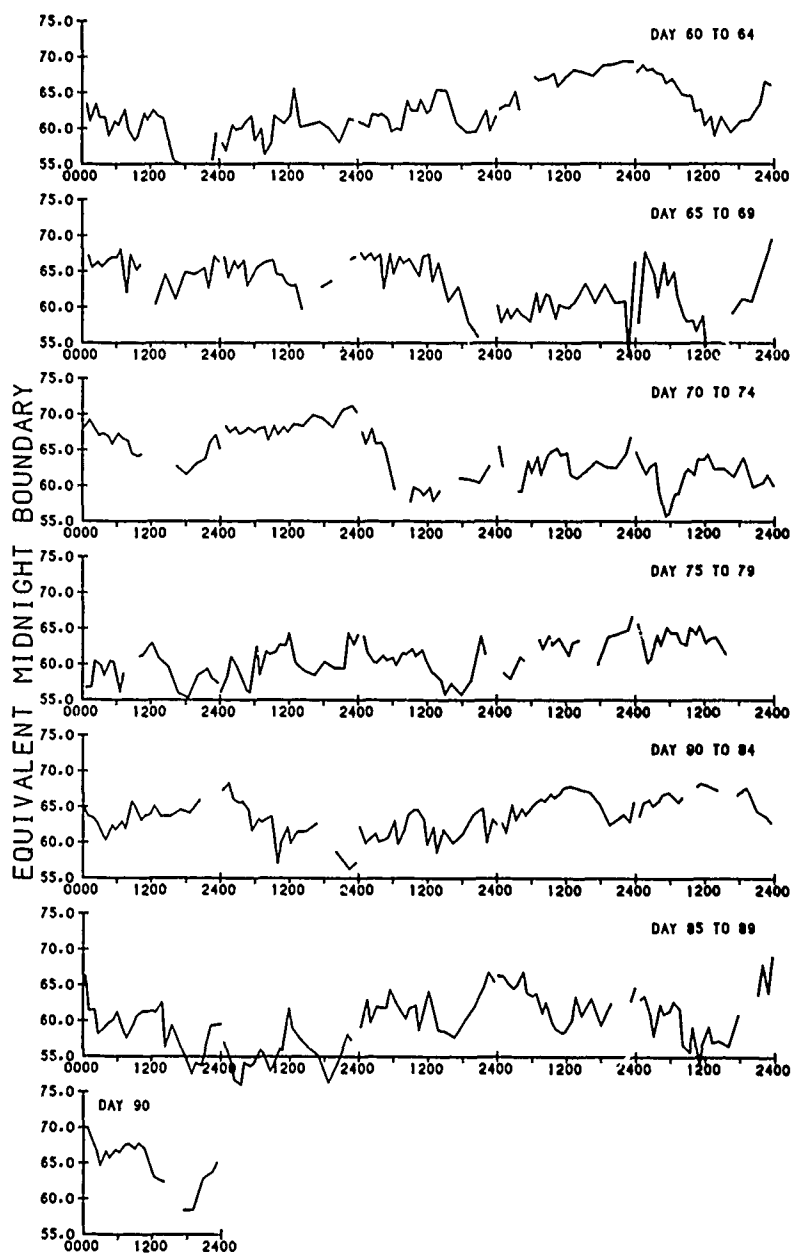


UT
EVENING

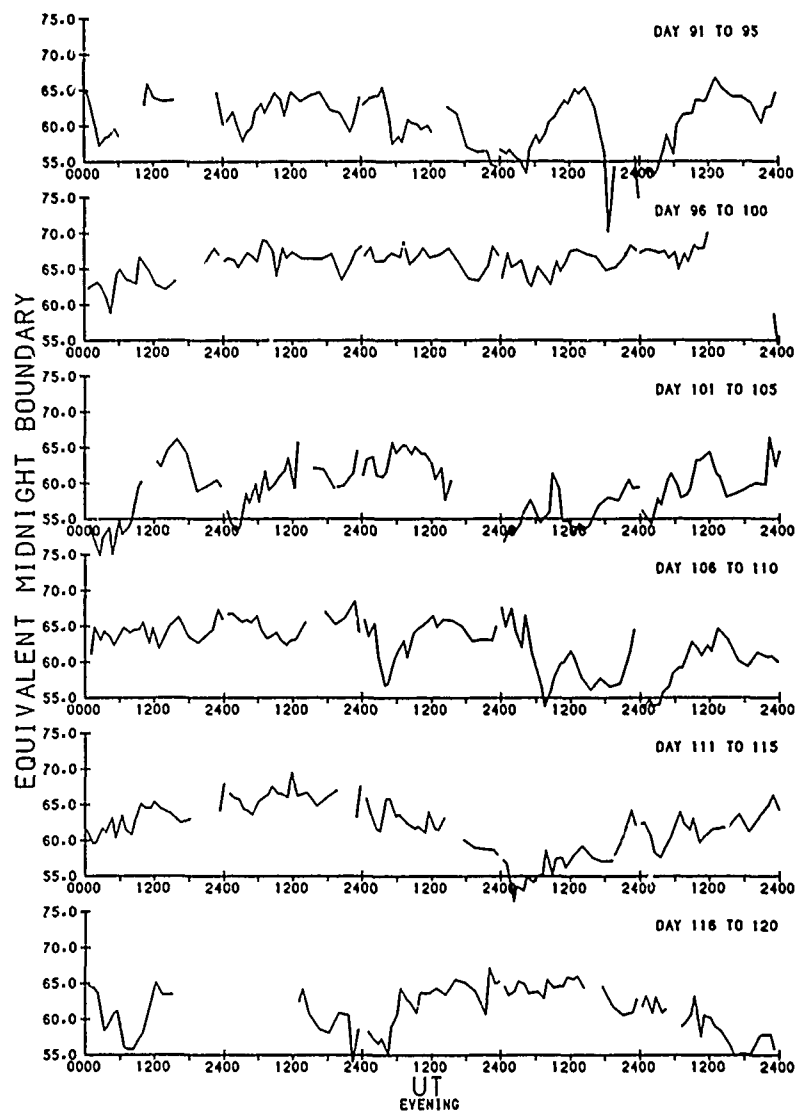
1978
FEBRUARY



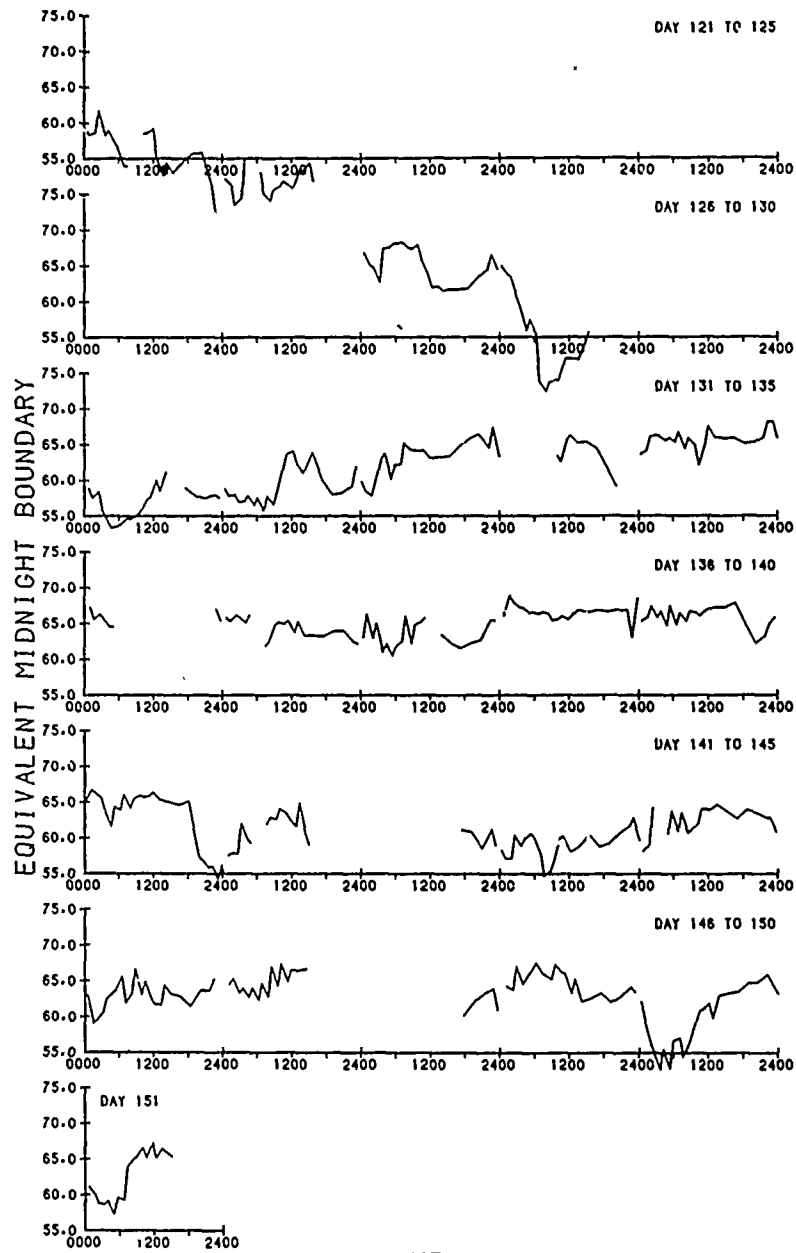
1978
MARCH



1978
APRIL

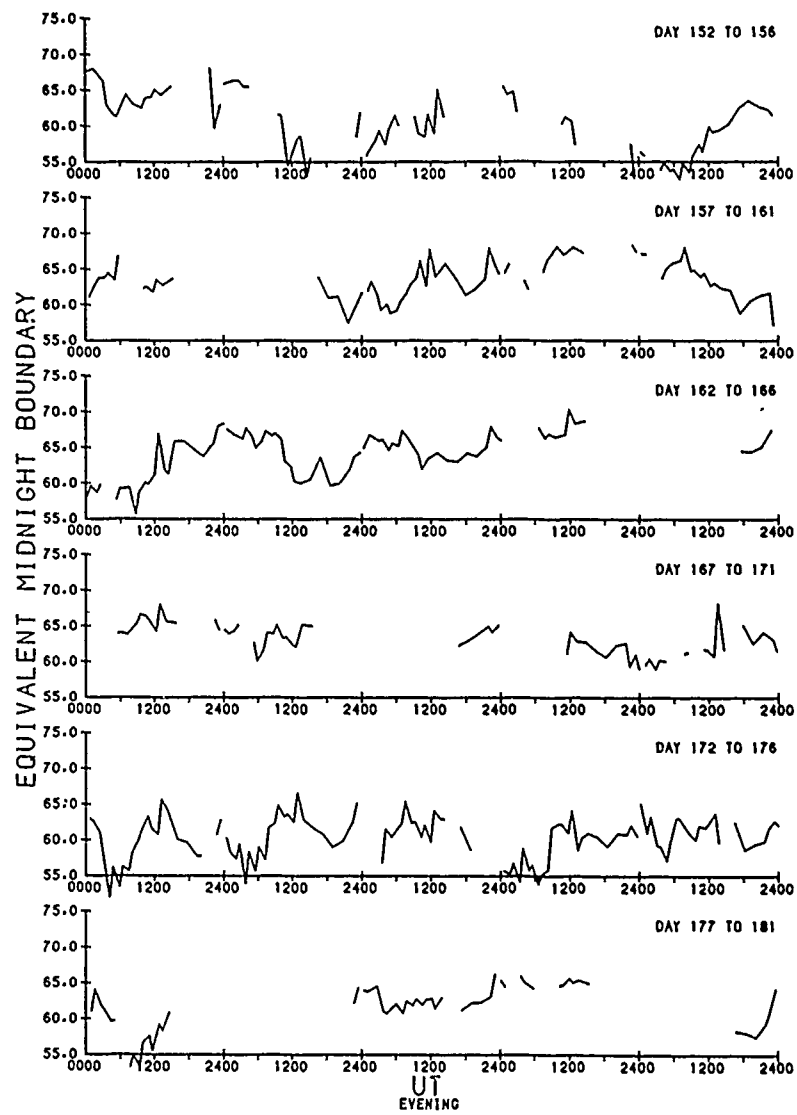


1978
MAY

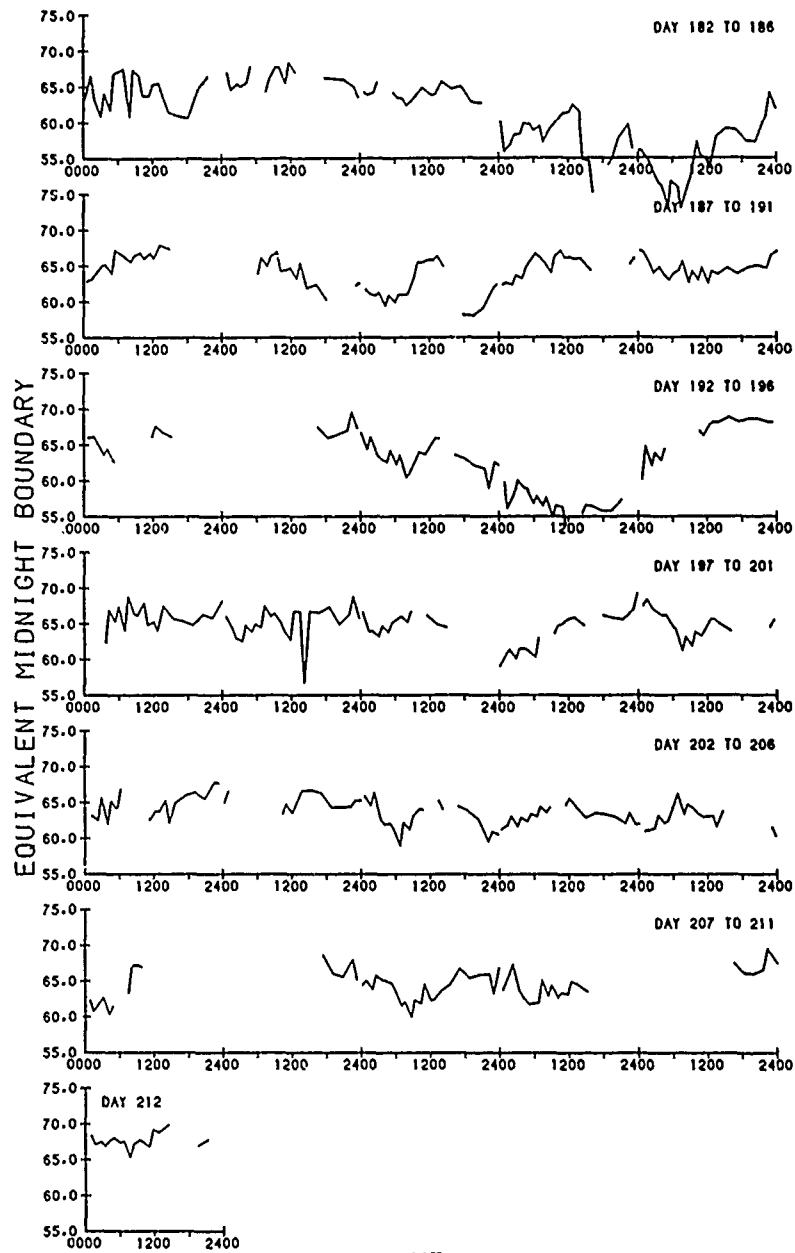


UT
EVENING

1978
JUNE

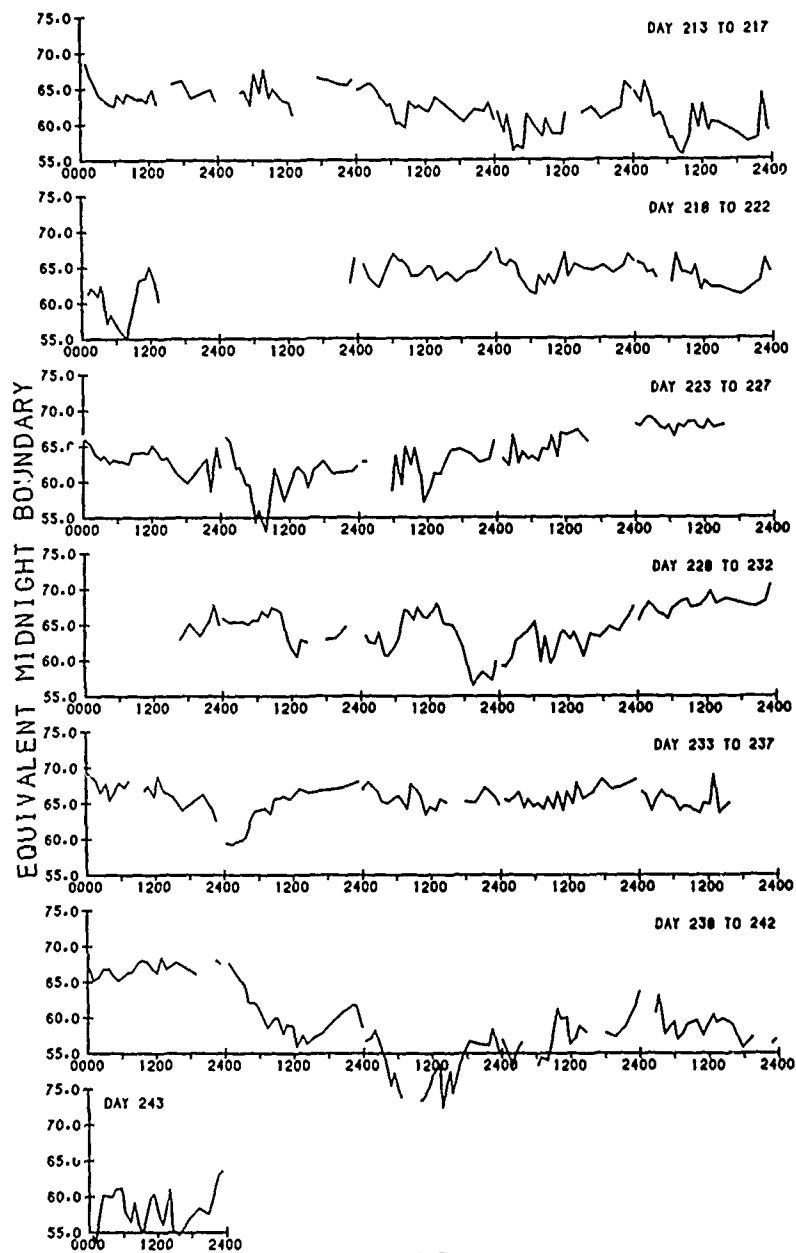


1978
JULY



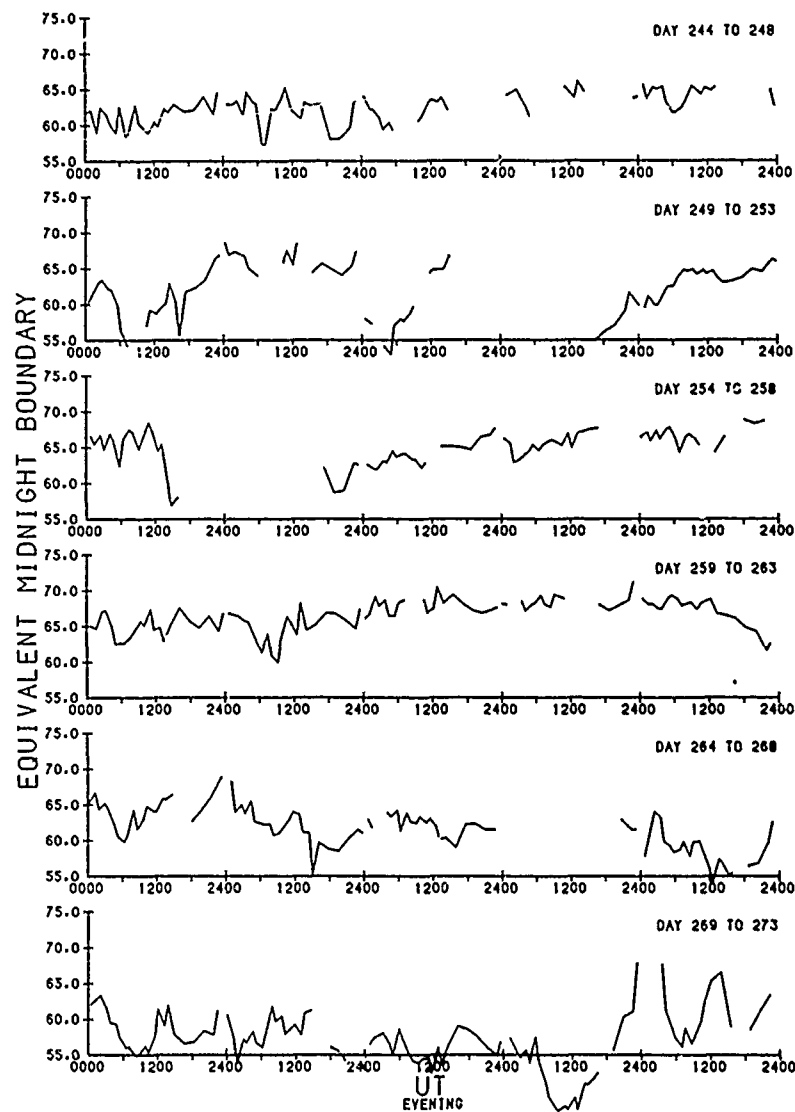
UT
EVENING

1978
AUGUST

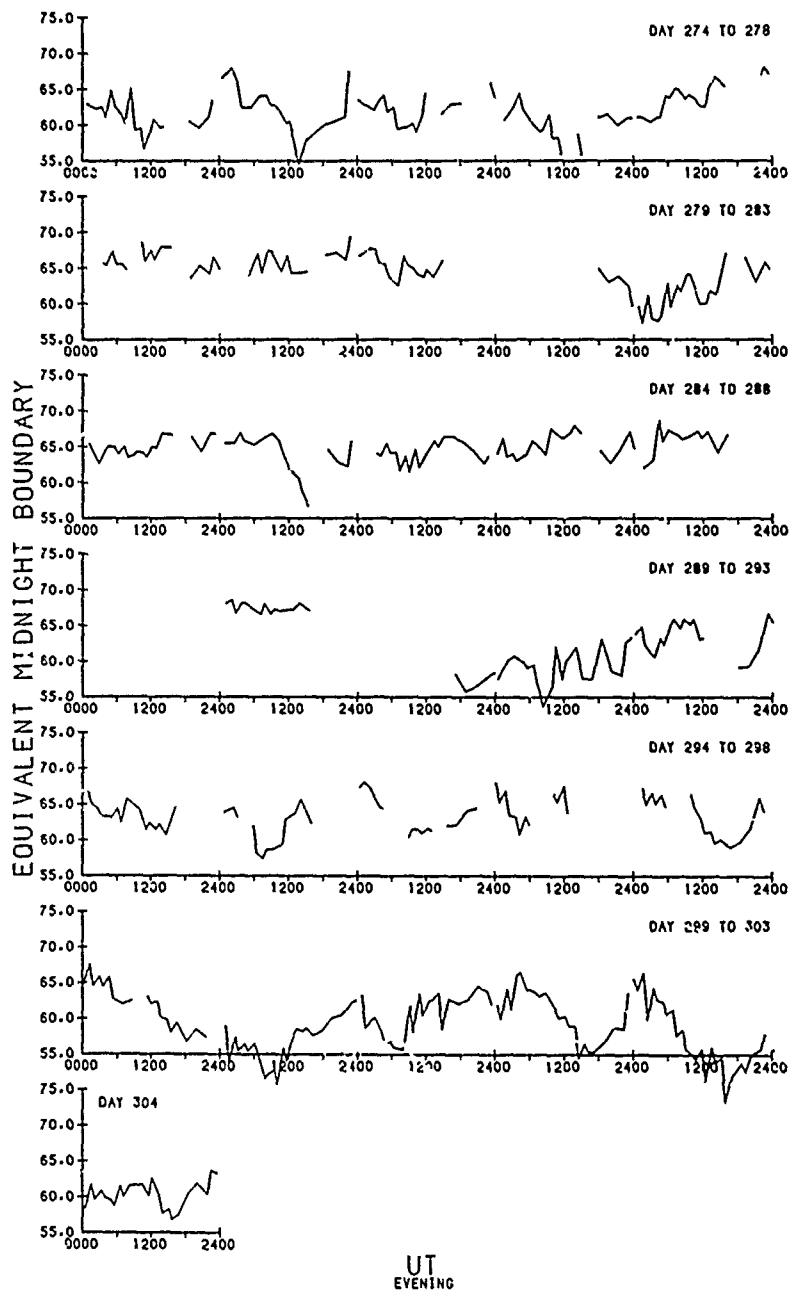


UT
EVENING

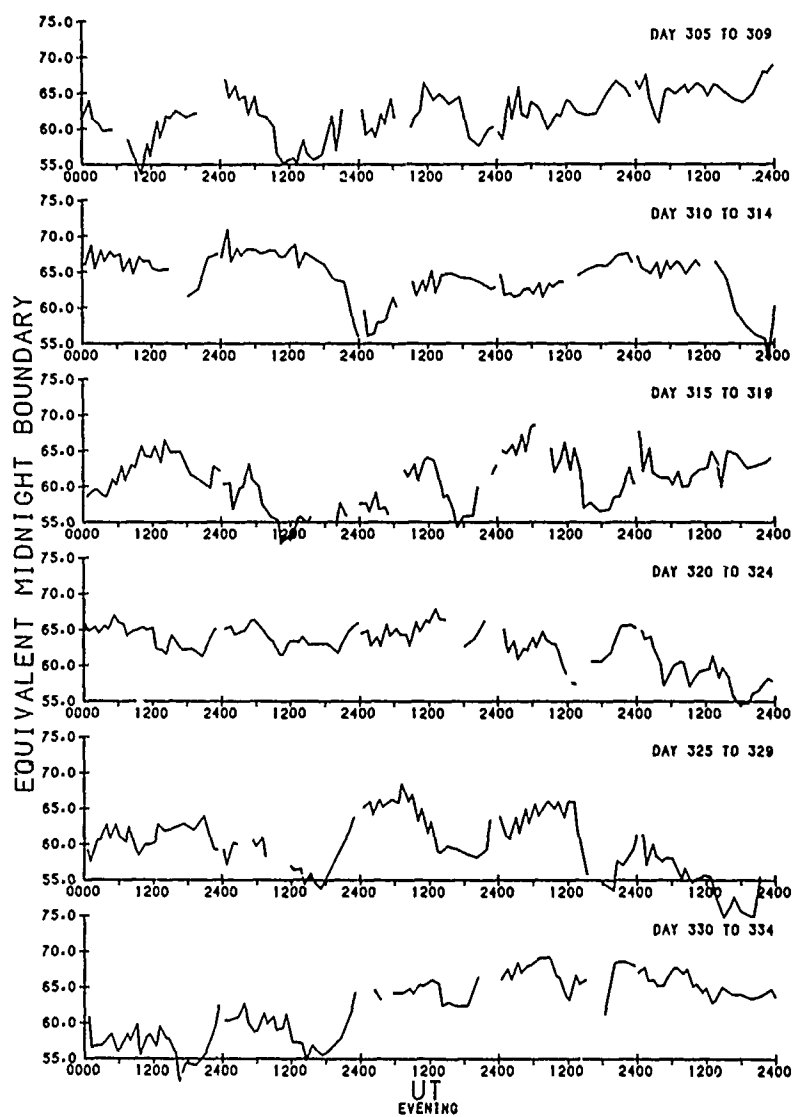
1978
SEPTEMBER



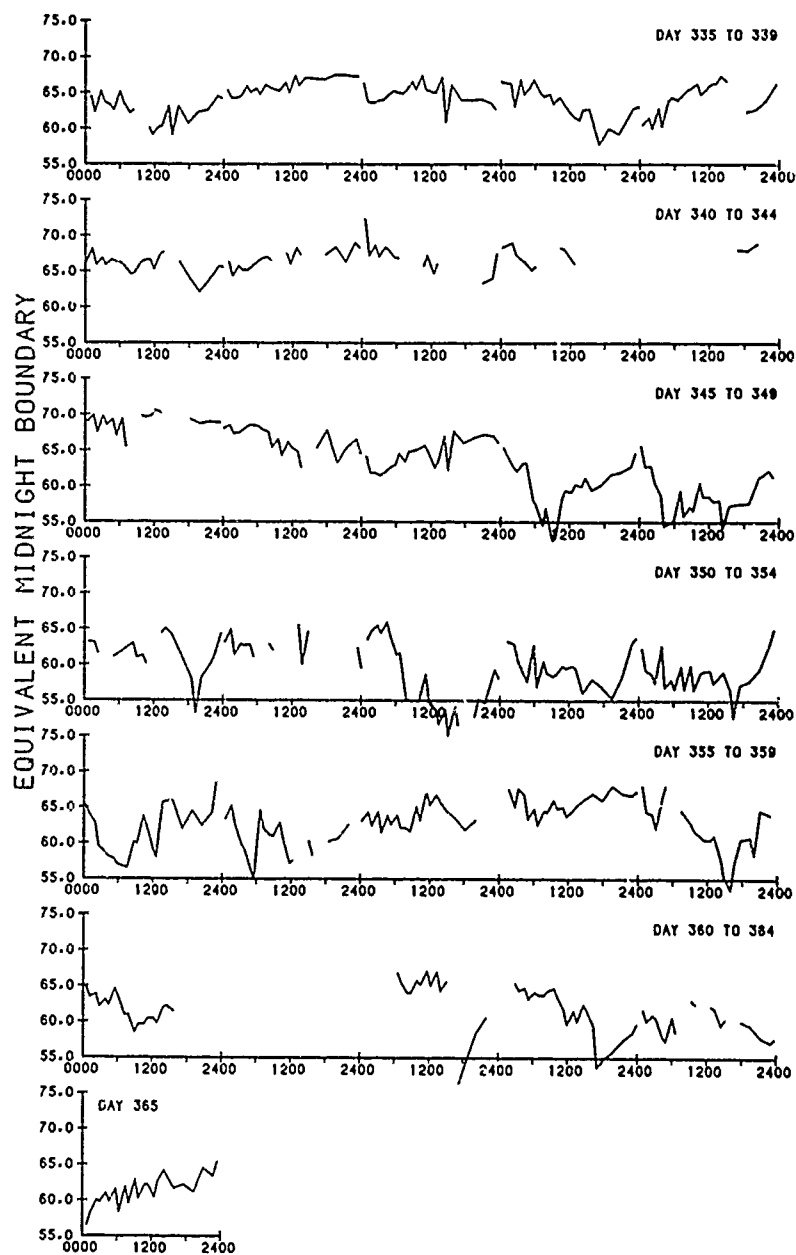
1978
OCTOBER



1978
NOVEMBER



1978
DECEMBER



Appendix B

1978 Auroral Boundary Listing

The following computer listing contains equatorward auroral boundary measurements made by hand and computer from DMSP/F2 precipitating electron particle data for the entire year of 1978. There are two sets of vertical columns on a page. A single set reads from left to right.

YR	= 1978
DA	= Julian Day
HDDK/HR, MN, SEC	= Exact universal time at which the hand-chosen boundary was measured.
PO	= Pole
HDDK/LT*	= Exact magnetic local time in hours at which the hand-chosen boundary was measured.
HDDK/LAT*	= Exact corrected geomagnetic latitude at which the hand-chosen boundary was measured.
CDDK/LT*	= Exact magnetic local time in hours at which the computer-chosen boundary was measured.
CDDK/LAT*	= Exact corrected geomagnetic latitude at which the computer-chosen boundary was measured.
DLAT*	= Computer-chosen boundary minus hand-chosen boundary.

MIDNIGHT/LATH* = Projection of the hand-chosen boundary (HDDK/LAT) measured in the given MLT (HDDK/LT) to the corrected geomagnetic latitude at which the boundary would occur in the midnight (23-24) magnetic local time bin, calculated as described in Section 5 of the preceding paper.

MIDNIGHT/LATC* = Same as MIDNIGHT/LATH except using CDDK/LAT and CDDK/LT.

*To read values in these columns correctly, multiply by 10^{-1} .

78

YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	CDJK	DLAT	MIDNIGHT LATH, LATH	YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	CDJK	DLAT	MIDNIGHT LATH, LATH
78	8	9	36	45	S	79	663	79	664	1	650	78	9	21	49	48	N	61	553	58	599	46	537
78	8	10	28	29	S	205	673	205	681	8	655	78	9	22	9	18	N	208	578	209	593	15	551
78	8	11	4	19	S	182	683	180	690	27	620	78	9	22	45	29	S	77	538	178	610	-1	520
78	8	11	16	32	S	92	690	92	695	5	620	78	9	23	3	29	S	59	584	77	544	6	514
78	8	11	55	29	N	64	688	65	665	-3	653	78	9	23	31	48	N	203	619	59	584	13	560
78	8	12	10	48	N	208	650	209	654	4	630	78	9	23	31	16	N	59	571	202	604	-15	596
78	8	12	47	17	S	170	673	168	687	14	618	78	10	0	26	47	S	70	563	184	627	2	545
78	8	13	37	0	N	56	634	56	634	0	629	78	10	0	44	34	S	70	563	184	627	2	545
78	8	13	52	0	N	211	665	211	667	2	655	78	10	1	14	19	N	57	599	57	599	0	591
78	8	17	2	44	N	49	602	49	603	1	573	78	10	1	33	21	N	192	621	192	623	2	584
78	8	17	17	48	N	208	602	210	628	26	577	78	10	2	6	45	S	188	609	188	609	0	555
78	8	18	47	8	N	45	656	48	638	-18	659	78	10	2	24	59	S	63	583	63	583	13	570
78	8	18	57	25	N	218	659	218	672	3	659	78	10	2	55	0	N	58	573	58	598	25	562
78	8	19	49	48	S	107	679	107	679	661	661	78	10	3	14	29	N	186	603	186	599	-4	548
78	8	20	29	33	N	47	673	50	655	-18	672	78	10	3	47	42	S	194	636	192	589	-47	601
78	8	20	40	29	N	217	657	218	664	7	646	78	10	4	4	28	S	63	609	63	607	-2	598
78	8	20	40	20	N	53	653	55	635	-18	650	78	10	4	36	15	N	65	570	65	613	43	556
78	8	22	23	50	N	214	657	214	662	5	646	78	10	4	53	44	N	188	634	188	650	16	585
78	8	23	4	20	S	177	668	175	680	12	610	78	10	5	27	45	S	199	639	199	638	-1	604
78	8	23	17	51	S	79	638	75	638	0	623	78	10	5	44	19	S	67	616	67	616	0	606
78	8	23	50	30	N	57	616	57	612	-4	609	78	10	6	17	34	N	73	587	73	618	31	567
78	9	0	6	20	N	184	684	206	683	0	645	78	10	6	33	37	N	193	645	193	645	0	611
78	9	1	0	58	S	69	597	69	609	22	574	78	10	7	7	29	S	198	628	198	628	-2	592
78	9	1	33	38	N	54	662	56	624	-38	660	78	10	7	23	58	S	70	625	70	643	18	609
78	9	1	48	28	N	192	682	192	682	0	645	78	10	8	0	0	N	78	656	76	646	-10	640
78	9	2	25	40	S	190	676	191	680	4	646	78	10	8	14	29	N	198	635	198	643	8	600
78	9	2	41	0	S	62	613	62	639	26	603	78	10	8	47	41	S	193	619	193	618	-1	582
78	9	3	14	46	N	58	655	58	646	-9	653	78	10	9	3	27	N	202	610	202	612	13	629
78	9	3	29	14	N	186	677	186	684	7	636	78	10	9	56	19	N	202	610	202	612	2	586
78	9	4	5	14	S	196	659	195	657	-2	627	78	10	10	29	1	S	187	629	187	633	4	579
78	9	4	21	0	S	63	620	63	624	4	610	78	10	10	43	58	S	85	647	86	673	26	627
78	9	4	56	21	N	67	629	67	632	-41	668	78	10	11	35	58	N	208	665	207	637	-28	646
78	9	5	9	31	N	189	673	189	683	10	632	78	10	13	17	15	N	212	675	211	669	-6	666
78	9	5	45	10	S	200	658	200	667	9	639	78	10	14	5	58	S	105	650	105	650	0	606
78	9	6	0	15	S	66	641	66	639	-2	633	78	10	14	45	2	N	209	642	209	644	2	621
78	9	6	36	31	N	74	655	74	636	-19	641	78	10	15	0	19	N	208	609	208	611	2	585
78	9	6	50	18	N	194	654	194	654	0	631	78	10	16	43	13	N	208	609	208	611	2	585
78	9	7	24	41	S	198	638	198	638	0	630	78	10	16	10	1	N	52	590	50	600	20	570
78	9	10	11	39	N	204	666	203	627	-39	647	78	10	18	25	19	N	209	604	210	612	8	579
78	9	10	47	40	S	182	681	184	660	-21	641	78	10	19	53	40	N	51	629	52	620	-9	625
78	9	11	0	19	S	87	666	88	668	2	648	78	10	20	6	30	N	214	638	214	640	2	625
78	9	11	52	58	N	209	659	209	665	-4	651	78	10	21	24	31	N	57	608	57	608	1	601
78	9	12	29	29	S	98	663	170	688	25	602	78	10	21	50	0	N	212	628	212	626	-2	613
78	9	12	41	18	S	98	663	97	655	-8	639	78	10	22	31	57	S	83	655	82	628	-4	681
78	9	13	20	19	N	56	655	58	634	-21	653	78	10	22	42	48	S	83	655	82	628	-4	681
78	9	13	34	58	N	211	662	211	665	3	651	78	10	23	15	18	N	59	590	57	619	27	636
78	9	15	17	40	N	209	637	209	639	2	616	78	10	23	32	13	N	208	662	208	662	0	643
78	9	16	45	21	N	49	602	49	601	-1	573	78	11	0	11	40	S	182	686	182	695	8	649
78	9	16	59	59	N	209	621	210	635	14	598	78	11	0	24	4	S	73	680	73	649	-31	668
78	9	18	28	19	N	208	592	209	598	6	566	78	11	1	0	1	N	53	679	55	634	-45	679
78	9	18	42	59	N	208	592	209	598	6	566	78	11	1	32	31	N	199	702	197	687	-15	676
78	9	20	8	44	N	57	564	55	599	33	552	78	11	1	52	1	S	188	683	188	682	-21	643
78	9	20	25	19	N	211	598	211	606	8	580	78	11	2	5	23	S	63	668	63	642	-26	663
78	9	20	25	19	N	211	598	211	606	8	580	78	11	2	40	58	N	56	667	56	653	-14	666

HDDK			CODK			MIDNIGHT			HDDK			CODK			MIDNIGHT		
YR	DA	HR MN SEC	PO	LT	LAT	YR	DA	HR MN SEC	PO	LT	LAT	YR	DA	HR MN SEC	PO	LT	LAT
78 13	17 20	0	N	46	634	78 13	17 20	0	N	46	634	78 13	17 20	0	N	46	634
78 13	17 32	12	N	212	645	78 13	17 32	12	N	212	645	78 13	17 32	12	N	212	645
78 13	22 40	59	N	210	632	78 13	22 40	59	N	210	632	78 13	22 40	59	N	210	632
78 13	23 20	12	S	178	672	78 13	23 20	12	S	178	672	78 13	23 20	12	S	178	672
78 13	23 34	50	S	76	600	78 13	23 34	50	S	76	600	78 13	23 34	50	S	76	600
78 14	0 5	46	N	58	599	78 14	0 5	46	N	58	599	78 14	0 5	46	N	58	599
78 14	0 23	0	N	203	667	78 14	0 23	0	N	203	667	78 14	0 23	0	N	203	667
78 14	1 0	47	S	185	670	78 14	1 0	47	S	185	670	78 14	1 0	47	S	185	670
78 14	1 15	0	S	68	647	78 14	1 15	0	S	68	647	78 14	1 15	0	S	68	647
78 14	1 49	49	N	54	671	78 14	1 49	49	N	54	671	78 14	1 49	49	N	54	671
78 14	2 3	59	N	192	691	78 14	2 3	59	N	192	691	78 14	2 3	59	N	192	691
78 14	2 41	0	S	191	685	78 14	2 41	0	S	191	685	78 14	2 41	0	S	191	685
78 14	2 56	0	S	61	634	78 14	2 56	0	S	61	634	78 14	2 56	0	S	61	634
78 14	3 31	13	N	59	675	78 14	3 31	13	N	59	675	78 14	3 31	13	N	59	675
78 14	3 44	23	N	186	695	78 14	3 44	23	N	186	695	78 14	3 44	23	N	186	695
78 14	4 21	24	S	197	676	78 14	4 21	24	S	197	676	78 14	4 21	24	S	197	676
78 14	4 35	30	S	62	652	78 14	4 35	30	S	62	652	78 14	4 35	30	S	62	652
78 14	5 12	1	N	68	670	78 14	5 12	1	N	68	670	78 14	5 12	1	N	68	670
78 14	5 24	23	N	199	702	78 14	5 24	23	N	199	702	78 14	5 24	23	N	199	702
78 14	6 1	12	S	200	672	78 14	6 1	12	S	200	672	78 14	6 1	12	S	200	672
78 14	6 14	55	S	66	665	78 14	6 14	55	S	66	665	78 14	6 14	55	S	66	665
78 14	6 53	12	N	75	689	78 14	6 53	12	N	75	689	78 14	6 53	12	N	75	689
78 14	7 5	34	N	194	671	78 14	7 5	34	N	194	671	78 14	7 5	34	N	194	671
78 14	7 40	50	S	197	685	78 14	7 40	50	S	197	685	78 14	7 40	50	S	197	685
78 14	7 55	59	S	71	638	78 14	7 55	59	S	71	638	78 14	7 55	59	S	71	638
78 14	8 45	10	N	199	674	78 14	8 45	10	N	199	674	78 14	8 45	10	N	199	674
78 14	9 21	45	S	190	666	78 14	9 21	45	S	190	666	78 14	9 21	45	S	190	666
78 14	9 36	15	S	78	640	78 14	9 36	15	S	78	640	78 14	9 36	15	S	78	640
78 14	10 12	54	N	205	682	78 14	10 12	54	N	205	682	78 14	10 12	54	N	205	682
78 14	10 26	58	N	180	689	78 14	10 26	58	N	180	689	78 14	10 26	58	N	180	689
78 14	11 3	51	S	89	648	78 14	11 3	51	S	89	648	78 14	11 3	51	S	89	648
78 14	11 16	38	S	89	648	78 14	11 16	38	S	89	648	78 14	11 16	38	S	89	648
78 14	11 54	12	N	64	668	78 14	11 54	12	N	64	668	78 14	11 54	12	N	64	668
78 14	12 8	22	N	210	632	78 14	12 8	22	N	210	632	78 14	12 8	22	N	210	632
78 14	12 27	35	S	163	710	78 14	12 27	35	S	163	710	78 14	12 27	35	S	163	710
78 14	12 56	57	S	100	665	78 14	12 56	57	S	100	665	78 14	12 56	57	S	100	665
78 14	13 37	16	N	52	677	78 14	13 37	16	N	52	677	78 14	13 37	16	N	52	677
78 14	13 49	35	N	214	682	78 14	13 49	35	N	214	682	78 14	13 49	35	N	214	682
78 14	17 3	59	N	41	668	78 14	17 3	59	N	41	668	78 14	17 3	59	N	41	668
78 14	17 13	37	N	217	682	78 14	17 13	37	N	217	682	78 14	17 13	37	N	217	682
78 14	22 21	58	N	215	671	78 14	22 21	58	N	215	671	78 14	22 21	58	N	215	671
78 14	23 4	48	S	172	722	78 14	23 4	48	S	172	722	78 14	23 4	48	S	172	722
78 14	23 15	42	S	81	666	78 14	23 15	42	S	81	666	78 14	23 15	42	S	81	666
78 14	23 50	6	N	55	640	78 14	23 50	6	N	55	640	78 14	23 50	6	N	55	640
78 15	0 45	2	S	209	703	78 15	0 45	2	S	209	703	78 15	0 45	2	S	209	703
78 15	1 46	14	N	195	712	78 15	1 46	14	N	195	712	78 15	1 46	14	N	195	712
78 15	2 25	14	S	191	703	78 15	2 25	14	S	191	703	78 15	2 25	14	S	191	703
78 15	2 37	36	S	60	681	78 15	2 37	36	S	60	681	78 15	2 37	36	S	60	681
78 15	3 13	36	N	58	658	78 15	3 13	36	N	58	658	78 15	3 13	36	N	58	658
78 15	3 27	10	N	187	706	78 15	3 27	10	N	187	706	78 15	3 27	10	N	187	706
78 15	4 3	1	S	197	682	78 15	4 3	1	S	197	682	78 15	4 3	1	S	197	682
78 15	4 18	9	S	60	665	78 15	4 18	9	S	60	665	78 15	4 18	9	S	60	665
78 15	4 55	30	N	67	687	78 15	4 55	30	N	67	687	78 15	4 55	30	N	67	687

YR	DA	HR	MIN	SLC	HDJK	PO	LT	LAT	CDJK	DLAT	MIDNIGHT LATH, LATC	DLAT	MIDNIGHT LATH, LATC	CDJK	LT	LAT	DLAT	MIDNIGHT LATH, LATC
78	19	1	16	47	S	186	681	649	186	681	649	186	681	186	681	649	186	681
78	19	1	31	0	S	186	687	650	186	687	650	186	687	186	687	650	186	687
78	19	2	4	49	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	2	20	29	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	2	56	14	S	191	653	651	191	653	651	191	653	191	653	651	191	653
78	19	3	11	46	S	191	653	651	191	653	651	191	653	191	653	651	191	653
78	19	4	1	8	N	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	4	36	36	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	4	52	53	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	5	26	21	N	190	678	678	190	678	678	190	678	190	678	678	190	678
78	19	5	40	44	N	190	678	678	190	678	678	190	678	190	678	678	190	678
78	19	6	16	38	S	200	667	667	200	667	667	200	667	200	667	667	200	667
78	19	6	31	22	S	200	667	667	200	667	667	200	667	200	667	667	200	667
78	19	7	8	29	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	7	21	20	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	7	56	48	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	8	11	7	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	9	2	35	N	200	667	667	200	667	667	200	667	200	667	667	200	667
78	19	9	37	16	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	9	51	39	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	10	28	1	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	10	43	47	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	11	13	21	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	11	32	47	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	12	25	15	N	209	655	655	209	655	655	209	655	209	655	655	209	655
78	19	12	25	15	N	209	655	655	209	655	655	209	655	209	655	655	209	655
78	19	13	13	33	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	13	51	34	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	14	7	7	N	210	653	653	210	653	653	210	653	210	653	653	210	653
78	19	15	49	16	N	210	653	653	210	653	653	210	653	210	653	653	210	653
78	19	17	18	7	N	210	653	653	210	653	653	210	653	210	653	653	210	653
78	19	17	31	8	N	211	640	640	211	640	640	211	640	211	640	640	211	640
78	19	19	1	59	N	211	640	640	211	640	640	211	640	211	640	640	211	640
78	19	19	12	15	N	217	666	666	217	666	666	217	666	217	666	666	217	666
78	19	20	43	45	N	218	668	668	218	668	668	218	668	218	668	668	218	668
78	19	20	54	51	N	218	668	668	218	668	668	218	668	218	668	668	218	668
78	19	21	49	31	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	21	49	31	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	22	23	2	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	22	38	27	N	213	663	663	213	663	663	213	663	213	663	663	213	663
78	19	23	19	59	S	175	708	708	175	708	708	175	708	175	708	708	175	708
78	19	23	32	59	S	175	708	708	175	708	708	175	708	175	708	708	175	708
78	20	0	5	47	N	205	685	685	205	685	685	205	685	205	685	685	205	685
78	20	0	21	2	N	205	685	685	205	685	685	205	685	205	685	685	205	685
78	20	1	12	43	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	20	2	2	32	N	186	659	659	186	659	659	186	659	186	659	659	186	659
78	20	2	40	44	S	192	699	699	192	699	699	192	699	192	699	699	192	699
78	20	3	53	29	S	192	699	699	192	699	699	192	699	192	699	699	192	699
78	20	3	53	29	S	192	699	699	192	699	699	192	699	192	699	699	192	699
78	20	3	42	49	N	187	707	707	187	707	707	187	707	187	707	707	187	707
78	20	3	42	49	N	187	707	707	187	707	707	187	707	187	707	707	187	707
78	20	4	31	16	S	197	677	677	197	677	677	197	677	197	677	677	197	677
78	20	4	31	16	S	197	677	677	197	677	677	197	677	197	677	677	197	677
78	20	5	11	22	S	197	677	677	197	677	677	197	677	197	677	677	197	677
78	20	5	11	22	S	197	677	677	197	677	677	197	677	197	677	677	197	677

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	COOK	DLAT	MIDNIGHT	DLAT	MIDNIGHT	COOK	DLAT	MIDNIGHT
78	21	9	15	28	S	72	713	77	702	-11	704	701	78	22	20	683	677
78	21	9	56	48	N	72	729	73	689	-40	721	687	78	22	21	689	684
78	21	10	7	46	N	204	703	204	695	-14	694	674	78	22	21	689	689
78	21	10	45	58	S	180	712	180	716	4	676	677	78	22	22	692	695
78	21	10	55	29	S	92	730	88	661	-69	721	553	78	22	22	692	692
78	21	11	49	23	N	210	697	210	694	-3	690	680	78	22	23	691	684
78	21	12	39	12	N	59	676	59	676	-7	691	685	78	22	23	691	684
78	21	13	18	58	N	52	690	53	683	-7	691	680	78	22	23	691	684
78	21	13	21	2	N	214	695	214	697	2	689	683	78	22	23	691	684
78	21	15	12	47	N	217	694	217	696	2	687	682	78	22	23	691	684
78	21	16	54	35	N	219	694	219	693	-1	687	679	78	22	23	691	684
78	21	18	36	38	N	221	693	221	692	-1	694	686	78	22	23	691	684
78	21	22	2	34	N	219	685	219	690	5	677	676	78	22	23	691	684
78	21	22	45	58	S	171	707	87	709	-1	697	707	78	22	23	691	684
78	21	22	55	40	S	87	710	87	709	-1	697	707	78	22	23	691	684
78	21	23	33	25	N	51	686	51	681	-5	687	688	78	22	23	691	684
78	21	23	45	47	N	210	695	210	695	0	688	681	78	22	23	691	684
78	21	23	45	47	N	132	714	182	716	2	680	677	78	22	23	691	684
78	21	0	26	47	S	72	698	72	691	-2	688	689	78	22	23	691	684
78	21	0	38	0	S	53	679	53	677	-2	679	684	78	22	23	691	684
78	21	1	14	35	N	197	701	197	702	1	675	673	78	22	23	691	684
78	21	1	28	12	N	197	701	197	702	1	675	673	78	22	23	691	684
78	21	2	6	36	S	199	691	199	697	6	653	668	78	22	23	691	684
78	21	2	19	46	S	62	666	62	673	7	661	678	78	22	23	691	684
78	21	2	55	37	N	56	670	56	667	-3	669	674	78	22	23	691	684
78	21	3	8	58	N	187	707	187	706	-1	672	668	78	22	23	691	684
78	21	3	47	2	S	196	699	196	694	-5	672	665	78	22	23	691	684
78	21	4	0	14	S	60	655	60	659	13	650	674	78	22	23	691	684
78	21	4	37	49	N	64	707	65	674	-33	705	679	78	22	23	691	684
78	21	4	37	49	N	188	707	188	707	0	672	669	78	22	23	691	684
78	21	4	49	11	S	201	687	201	690	3	670	669	78	22	23	691	684
78	21	5	26	36	S	63	672	63	685	13	667	691	78	22	23	691	684
78	21	5	39	37	S	73	680	73	697	17	668	695	78	22	23	691	684
78	21	6	17	44	N	192	686	192	689	3	658	661	78	22	23	691	684
78	21	6	29	59	N	199	680	199	682	2	651	655	78	22	23	691	684
78	21	7	6	22	S	68	689	67	700	11	686	708	78	22	23	691	684
78	21	7	18	59	S	68	689	67	700	11	686	708	78	22	23	691	684
78	21	7	58	48	N	76	703	75	701	-2	693	700	78	22	23	691	684
78	21	8	10	48	S	197	677	197	677	0	647	650	78	22	23	691	684
78	21	8	46	47	S	193	681	193	677	-4	652	650	78	22	23	691	684
78	21	8	59	36	S	75	680	75	672	-8	668	688	78	22	23	691	684
78	21	9	37	53	N	202	675	202	676	1	657	657	78	22	23	691	684
78	21	10	28	1	S	184	686	184	687	1	647	650	78	22	23	691	684
78	21	10	40	0	S	86	686	86	676	-10	670	670	78	22	23	691	684
78	21	11	33	22	N	207	667	207	667	0	648	649	78	22	23	691	684
78	21	12	10	36	S	171	695	171	697	1	654	649	78	22	23	691	684
78	21	12	20	36	S	99	690	99	689	-1	672	683	78	22	23	691	684
78	21	12	20	36	S	99	690	99	689	-1	672	683	78	22	23	691	684
78	21	13	0	49	N	57	671	56	676	5	670	683	78	22	23	691	684
78	21	13	15	0	N	210	668	210	665	-3	658	652	78	22	23	691	684
78	21	14	56	59	N	211	662	213	677	15	651	664	78	22	23	691	684
78	21	16	27	59	N	41	671	44	648	-23	670	643	78	22	23	691	684
78	21	16	38	18	N	215	673	216	680	7	664	667	78	22	23	691	684
78	21	18	9	58	N	45	652	42	659	17	643	670	78	22	23	691	684
78	21	18	20	1	N	218	678	219	682	4	669	668	78	22	23	691	684
78	21	19	53	14	N	43	687	43	688	1	692	695	78	22	23	691	684

86

92

				HDDK				CDDK				MIDNIGHT			
YR	DA	HR	MIN	SEC	PO	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT
78 41	17 49 15	N	214	664	N	214	655	214	655	214	655	214	655	214	655
78 41	17 59 47	N	214	656	N	214	645	214	645	214	645	214	645	214	645
78 41	19 29 48	N	51	621	N	51	621	51	621	51	621	51	621	51	621
78 41	19 42 44	N	214	636	N	214	645	214	645	214	645	214	645	214	645
78 41	21 11 30	N	55	622	N	55	622	55	622	55	622	55	622	55	622
78 41	21 24 38	N	217	662	N	217	662	217	662	217	662	217	662	217	662
78 41	22 8 49	S	161	729	S	161	729	161	729	161	729	161	729	161	729
78 41	22 19 2	S	85	642	S	85	642	85	642	85	642	85	642	85	642
78 41	22 54 29	N	53	665	N	53	665	53	665	53	665	53	665	53	665
78 41	23 7 13	N	214	685	N	214	685	214	685	214	685	214	685	214	685
78 41	23 48 20	S	173	699	S	173	699	173	699	173	699	173	699	173	699
78 41	24 1 5	S	76	649	S	76	649	76	649	76	649	76	649	76	649
78 42	0 35 30	N	55	651	N	55	651	55	651	55	651	55	651	55	651
78 42	0 50 0	N	203	696	N	203	696	203	696	203	696	203	696	203	696
78 42	1 28 47	S	188	694	S	188	694	188	694	188	694	188	694	188	694
78 42	1 42 0	S	67	661	S	67	661	67	661	67	661	67	661	67	661
78 42	2 17 20	N	56	662	N	56	662	56	662	56	662	56	662	56	662
78 42	2 31 10	N	191	708	N	191	708	191	708	191	708	191	708	191	708
78 42	3 8 58	S	194	690	S	194	690	194	690	194	690	194	690	194	690
78 42	3 22 0	S	60	673	S	60	673	60	673	60	673	60	673	60	673
78 42	3 59 42	N	61	698	N	61	698	61	698	61	698	61	698	61	698
78 42	4 11 35	N	187	709	N	187	709	187	709	187	709	187	709	187	709
78 42	4 49 1	S	200	691	S	200	691	200	691	200	691	200	691	200	691
78 42	5 2 58	S	64	644	S	64	644	64	644	64	644	64	644	64	644
78 42	5 39 59	N	70	680	N	70	680	70	680	70	680	70	680	70	680
78 42	5 51 53	N	190	701	N	190	701	190	701	190	701	190	701	190	701
78 42	6 28 40	S	200	682	S	200	682	200	682	200	682	200	682	200	682
78 42	6 42 37	S	67	652	S	67	652	67	652	67	652	67	652	67	652
78 42	7 19 44	N	74	652	N	74	652	74	652	74	652	74	652	74	652
78 42	7 32 58	N	194	679	N	194	679	194	679	194	679	194	679	194	679
78 42	8 8 21	S	195	633	S	195	633	195	633	195	633	195	633	195	633
78 42	8 22 0	S	71	672	S	71	672	71	672	71	672	71	672	71	672
78 42	9 14 29	N	199	654	N	199	654	199	654	199	654	199	654	199	654
78 42	9 49 0	S	188	660	S	188	660	188	660	188	660	188	660	188	660
78 42	10 2 57	S	79	657	S	79	657	79	657	79	657	79	657	79	657
78 42	10 40 23	N	71	656	N	71	656	71	656	71	656	71	656	71	656
78 42	10 55 43	N	204	654	N	204	654	204	654	204	654	204	654	204	654
78 42	11 31 30	S	177	688	S	177	688	177	688	177	688	177	688	177	688
78 42	11 42 2	S	95	705	S	95	705	95	705	95	705	95	705	95	705
78 42	12 21 19	N	63	614	N	63	614	63	614	63	614	63	614	63	614
78 42	12 37 1	N	209	662	N	209	662	209	662	209	662	209	662	209	662
78 42	13 23 30	S	106	665	S	106	665	106	665	106	665	106	665	106	665
78 42	14 3 34	N	54	625	N	54	625	54	625	54	625	54	625	54	625
78 42	14 18 18	N	212	673	N	212	673	212	673	212	673	212	673	212	673
78 42	15 49 31	N	41	680	N	41	680	41	680	41	680	41	680	41	680
78 42	16 0 15	N	213	669	N	213	669	213	669	213	669	213	669	213	669
78 42	17 31 1	N	45	640	N	45	640	45	640	45	640	45	640	45	640
78 42	17 42 21	N	215	662	N	215	662	215	662	215	662	215	662	215	662
78 42	22 49 18	N	217	695	N	217	695	217	695	217	695	217	695	217	695
78 42	23 31 55	S	175	719	S	175	719	175	719	175	719	175	719	175	719
78 42	23 42 15	S	81	703	S	81	703	81	703	81	703	81	703	81	703
78 43	0 20 0	N	51	694	N	51	694	51	694	51	694	51	694	51	694
78 43	0 32 20	N	207	705	N	207	705	207	705	207	705	207	705	207	705
78 43	1 12 20	S	186	712	S	186	712	186	712	186	712	186	712	186	712

94

95

YR	DA	HR	MN	SEC	PO	HODK	LT	LAT	CDCK	DLAT	MIDNIGHT	LA-H, L, A, C	YR	DA	HR	MN	SEC	PO	HODK	LT	LAT	CDCK	DLAT	MIDNIGHT	LA-H, L, A, C
78	52	5	33	58	S	65	645	65	639	-6	638	641	78	52	5	33	58	S	65	645	65	639	-6	638	641
78	52	6	10	31	N	72	652	72	641	-11	638	635	78	52	6	10	31	N	72	652	72	641	-11	638	635
78	52	6	23	47	N	192	677	192	676	-1	647	650	78	52	6	23	47	N	192	677	192	676	-1	647	650
78	52	6	58	46	S	198	650	198	653	6	617	632	78	52	6	58	46	S	198	650	198	653	6	617	632
78	52	7	13	34	S	67	655	68	633	-22	649	635	78	52	7	13	34	S	67	655	68	633	-22	649	635
78	52	7	50	47	N	75	646	75	643	-3	631	637	78	52	7	50	47	N	75	646	75	643	-3	631	637
78	52	8	4	39	N	196	664	196	670	5	633	644	78	52	8	4	39	N	196	664	196	670	5	633	644
78	52	8	39	21	S	193	658	193	671	13	626	645	78	52	8	39	21	S	193	658	193	671	13	626	645
78	52	9	45	20	N	201	672	201	656	-14	637	651	78	52	9	45	20	N	201	672	201	656	-14	637	651
78	52	10	21	0	S	185	683	184	695	12	654	655	78	52	10	21	0	S	185	683	184	695	12	654	655
78	52	10	33	30	S	83	678	82	648	-30	661	638	78	52	10	33	30	S	83	678	82	648	-30	661	638
78	52	11	11	21	N	69	645	69	645	10	642	652	78	52	11	11	21	N	69	645	69	645	10	642	652
78	52	11	26	58	N	206	661	206	671	10	642	652	78	52	11	26	58	N	206	661	206	671	10	642	652
78	52	12	3	49	S	171	705	171	709	4	669	664	78	52	12	3	49	S	171	705	171	709	4	669	664
78	52	12	14	28	S	94	672	94	673	1	650	661	78	52	12	14	28	S	94	672	94	673	1	650	661
78	52	12	52	55	N	60	637	60	637	12	625	640	78	52	12	52	55	N	60	637	60	637	12	625	640
78	52	13	9	11	N	208	646	209	658	12	625	640	78	52	13	9	11	N	208	646	209	658	12	625	640
78	52	13	56	58	S	101	637	119	712	75	593	613	78	52	13	56	58	S	101	637	119	712	75	593	613
78	52	14	35	11	N	54	610	53	616	6	603	620	78	52	14	35	11	N	54	610	53	616	6	603	620
78	52	14	51	12	N	209	641	210	651	10	620	639	78	52	14	51	12	N	209	641	210	651	10	620	639
78	52	16	16	23	N	208	622	208	622	5	552	571	78	52	16	16	23	N	208	622	208	622	5	552	571
78	52	17	42	45	N	53	564	53	559	8	581	603	78	52	17	42	45	N	53	564	53	559	8	581	603
78	52	17	58	44	N	209	605	210	613	6	571	590	78	52	17	58	44	N	209	605	210	613	6	571	590
78	52	18	48	14	S	54	587	54	587	6	571	590	78	52	18	48	14	S	54	587	54	587	6	571	590
78	52	19	25	42	N	212	616	213	629	13	600	612	78	52	19	25	42	N	212	616	213	629	13	600	612
78	52	19	40	33	N	55	613	54	627	14	606	632	78	52	19	40	33	N	55	613	54	627	14	606	632
78	52	21	8	24	N	214	628	214	627	9	613	626	78	52	21	8	24	N	214	628	214	627	9	613	626
78	52	21	23	0	N	168	680	169	682	2	620	623	78	52	21	23	0	N	168	680	169	682	2	620	623
78	52	22	4	6	S	87	646	87	654	8	626	645	78	52	22	4	6	S	87	646	87	654	8	626	645
78	52	22	15	59	S	58	618	58	615	8	612	619	78	52	22	15	59	S	58	618	58	615	8	612	619
78	52	22	50	2	N	209	622	209	621	-3	512	619	78	52	22	50	2	N	209	622	209	621	-3	512	619
78	52	23	6	39	N	181	660	181	657	-1	599	607	78	52	23	6	39	N	181	660	181	657	-1	599	607
78	52	23	41	16	S	181	660	181	657	-3	616	621	78	52	23	41	16	S	181	660	181	657	-3	616	621
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	23	58	11	S	77	650	77	636																

YR	DA	HR	MM	SEC	PO	HDCK	LT	LAT	CDCK	DLAT	MIDNIGHT	DLAT	MIDNIGHT	YR	DA	HR	MM	SEC	PO	HDCK	LT	LAT	CDCK	DLAT	MIDNIGHT	DLAT	MIDNIGHT	
78	58	1	21	58	N	197	642	197	642	-1	606	318	78	59	4	8	21	N	189	602	65	560	4	8	21	N	189	602
78	58	2	14	43	S	190	629	191	627	-2	593	606	78	59	5	19	0	S	189	603	68	557	5	19	0	S	189	603
78	58	3	2	59	N	189	639	190	642	3	591	619	78	59	6	39	25	N	192	637	71	563	6	39	25	N	192	637
78	58	4	26	2	N	189	638	190	642	3	591	619	78	59	7	31	15	N	192	637	71	563	7	31	15	N	192	637
78	58	5	15	59	S	198	605	199	619	13	567	599	78	59	8	38	0	S	192	637	71	563	8	38	0	S	192	637
78	58	6	7	6	N	192	609	193	619	17	569	595	78	59	9	28	27	N	193	619	72	583	9	28	27	N	193	619
78	58	7	15	17	S	197	604	197	609	5	565	590	78	59	10	0	40	S	188	622	68	604	10	0	40	S	188	622
78	58	8	3	6	N	193	653	193	653	11	623	641	78	59	11	43	21	N	193	653	68	604	11	43	21	N	193	653
78	58	9	52	42	S	193	643	193	643	4	628	642	78	59	12	32	54	S	193	643	68	604	12	32	54	S	193	643
78	58	10	18	37	S	186	652	186	652	3	620	616	78	59	13	33	36	N	207	597	64	600	13	33	36	N	207	597
78	58	11	9	58	N	197	642	197	642	-3	638	636	78	59	14	15	44	N	207	597	64	600	14	15	44	N	207	597
78	58	12	12	58	N	174	684	175	682	-2	635	631	78	59	15	23	44	N	208	591	55	542	15	23	44	N	208	591
78	58	13	43	30	S	168	652	169	644	-8	574	569	78	59	16	17	18	S	172	648	58	558	16	17	18	S	172	648
78	58	14	32	20	S	194	572	194	572	5	561	580	78	59	17	47	28	N	210	627	60	590	17	47	28	N	210	627
78	58	15	51	0	N	206	605	206	605	16	538	572	78	59	18	51	44	N	211	585	60	544	18	51	44	N	211	585
78	58	16	33	59	N	205	566	205	566	-5	552	561	78	59	19	40	18	N	209	590	56	565	19	40	18	N	209	590
78	58	17	58	40	N	207	572	207	572	4	544	566	78	59	20	4	44	N	211	585	60	544	20	4	44	N	211	585
78	58	18	15	34	S	194	563	195	625	6	596	611	78	59	21	23	0	S	172	648	58	558	21	23	0	S	172	648
78	58	19	40	51	N	197	642	197	642	-7	550	557	78	59	22	17	18	N	210	627	60	590	22	17	18	N	210	627
78	58	20	57	22	N	210	592	210	592	9	573	575	78	59	23	43	0	N	202	654	58	630	23	43	0	N	202	654
78	58	21	22	30	N	210	583	210	583	42	548	609	78	59	24	47	19	S	189	655	66	548	24	47	19	S	189	655
78	58	22	17	41	S	175	621	175	621	0	536	557	78	59	25	56	29	S	175	621	58	630	25	56	29	S	175	621
78	58	23	4	0	S	194	568	194	568	22	554	571	78	59	26	47	19	S	189	655	66	548	26	47	19	S	189	655
78	58	24	22	45	S	208	619	208	619	1	596	606	78	59	27	15	28	N	194	658	74	647	27	15	28	N	194	658
78	58	25	0	23	S	182	677	182	677	19	572	602	78	59	28	4	42	S	193	626	65	630	28	4	42	S	193	626
78	58	26	15	40	S	75	591	75	591	9	586	608	78	59	29	19	9	S	191	644	70	631	29	19	9	S	191	644
78	58	27	0	46	N	201	671	201	671	-1	653	651	78	59	30	3	27	N	192	665	66	548	30	3	27	N	192	665
78	58	28	1	3	N	190	652	190	652	20	619	646	78	59	31	56	0	S	194	649	194	554	31	56	0	S	194	649
78	58	29	1	40	S	190	652	190	652	-31	631	607	78	59	32	4	0	S	189	655	66	548	32	4	0	S	189	655
78	58	30	1	55	S	68	639	68	639	-56	626	571	78	59	33	56	29	S	175	621	58	630	33	56	29	S	175	621
78	58	31	2	29	N	190	631	190	631	3	592	570	78	59	34	19	9	N	194	658	74	647	34	19	9	N	194	658
78	58	32	18	40	S	194	594	194	594	15	554	590	78	59	35	8	19	S	195	634	195	634	35	8	19	S	195	634
78	58	33	3	38	S	66	553	66	553	141	537	701	78	59	36	19	9	S	195	634	195	634	36	19	9	S	195	634

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDCK	DLAT	LATH	LATC	MIDNIGHT	DLAT	LATH	LATC	CDCK	LT	LAT	CDCK	DLAT	LATH	LATC	MIDNIGHT
78	62	22	51	38	S	176	559	173	670	11	596	610	28	28	676	715	73	715	73	715	28	676	715	28
78	62	23	5	19	S	93	638	82	627	-11	617	615	-1	-1	669	666	192	695	192	695	-1	669	666	-1
78	62	23	38	27	N	59	614	59	612	18	607	617	1	1	662	650	200	680	200	680	1	662	650	1
78	62	23	55	31	N	207	637	207	639	2	616	623	66	66	694	700	66	694	66	694	-1	691	700	-1
78	63	0	32	41	S	195	658	195	658	0	625	631	75	75	708	707	75	708	75	708	-2	701	707	-2
78	63	0	46	38	S	74	666	74	666	-7	642	644	196	196	677	684	196	677	196	677	-4	647	647	-4
78	63	1	22	0	N	56	671	56	671	-30	670	643	193	193	671	671	193	671	193	671	10	650	669	10
78	63	1	36	58	N	197	603	197	603	3	632	641	8	8	50	50	8	50	8	50	10	650	669	10
78	63	2	12	58	S	192	682	192	682	23	630	657	78	78	641	645	201	663	201	663	0	644	645	0
78	63	2	27	36	S	66	654	66	654	-13	647	643	10	10	17	17	186	666	186	666	5	623	634	5
78	63	3	3	32	N	59	676	59	676	-17	670	663	82	82	665	658	82	665	82	665	17	628	658	17
78	63	3	17	18	N	190	680	191	680	10	651	66	70	70	648	642	70	648	70	648	-5	632	636	-5
78	63	3	53	2	S	197	658	198	679	21	626	652	205	205	645	629	205	645	205	645	-1	625	629	-1
78	63	4	7	44	S	64	654	64	654	10	647	668	177	177	664	607	177	664	177	664	-2	604	607	-2
78	63	6	3	14	N	192	658	192	658	0	671	669	61	61	635	637	61	635	61	635	-5	615	617	-5
78	63	7	13	52	S	199	694	199	694	-1	667	665	78	78	641	641	208	637	208	637	5	589	600	5
78	63	7	27	11	S	68	667	68	667	10	662	683	6	6	637	620	106	667	106	667	6	637	620	6
78	63	8	17	51	N	75	694	75	694	-20	682	671	78	78	641	641	53	623	53	623	-10	617	617	-10
78	63	8	54	27	S	192	697	192	697	6	670	668	209	209	637	616	209	637	209	637	-6	616	616	-6
78	63	9	6	53	S	74	652	74	652	-3	678	668	211	211	637	626	211	637	211	637	-10	617	617	-10
78	63	9	58	51	N	202	692	202	692	-3	678	668	51	51	599	615	51	599	51	599	18	594	626	18
78	63	10	35	29	S	183	695	183	695	3	658	660	212	212	624	615	212	624	212	624	1	609	615	1
78	63	10	47	38	S	85	677	85	677	21	660	695	107	107	651	620	107	651	107	651	-3	616	623	-3
78	63	11	40	19	N	208	685	208	685	3	666	668	53	53	619	619	53	619	53	619	-13	643	644	-13
78	63	12	28	1	S	98	682	101	706	18	669	700	214	214	627	626	214	627	214	627	22	635	656	22
78	63	13	21	43	N	213	689	213	689	-1	691	674	54	54	639	639	54	639	54	639	-13	643	644	-13
78	63	15	3	38	N	216	685	216	685	4	677	675	168	168	708	660	168	708	168	708	0	665	660	0
78	63	16	35	46	N	41	673	42	673	6	672	673	88	88	660	673	88	660	88	660	13	641	667	13
78	63	16	45	31	N	218	681	218	681	5	674	683	215	215	699	654	215	699	215	699	11	660	668	11
78	63	18	16	30	N	42	674	42	674	-2	679	673	215	215	699	654	215	699	215	699	11	660	668	11
78	63	18	27	13	N	221	687	221	687	-2	697	704	182	182	696	658	182	696	182	696	-7	666	667	-7
78	63	20	0	58	N	44	688	44	688	-1	668	680	78	78	641	641	78	641	78	641	-7	666	667	-7
78	63	20	9	29	N	223	688	223	688	-5	717	710	55	55	674	657	55	674	55	674	-19	671	650	-19
78	63	21	43	16	N	45	705	45	705	1	692	687	78	78	641	641	78	641	78	641	-19	671	650	-19
78	63	21	52	19	N	222	692	222	692	-3	673	706	50	50	693	653	50	693	50	693	15	658	685	15
78	63	22	37	13	S	156	734	156	734	0	692	685	215	215	699	654	215	699	215	699	-15	674	654	-15
78	63	22	46	16	S	89	693	89	693	0	692	685	193	193	693	655	193	693	193	693	2	663	665	2
78	63	23	23	30	N	215	699	215	699	2	678	675	78	78	641	641	78	641	78	641	15	669	673	15
78	63	23	35	38	N	183	712	183	712	-1	699	711	64	64	663	658	64	663	64	663	15	657	664	15
78	64	0	17	0	S	183	712	183	712	-10	713	708	78	78	641	641	78	641	78	641	6	679	696	6
78	64	0	27	58	S	77	708	77	708	-2	688	683	78	78	641	641	78	641	78	641	3	664	666	3
78	64	1	6	20	N	53	710	54	700	-2	688	683	78	78	641	641	78	641	78	641	8	669	673	8
78	64	1	18	25	N	203	703	203	703	-20	717	707	78	78	641	641	78	641	78	641	5	685	700	5
78	64	1	57	20	S	192	705	192	705	-7	717	714	78	78	641	641	78	641	78	641	3	672	671	3
78	64	2	8	36	S	66	719	67	699	-4	683	673	78	78	641	641	78	641	78	641	5	681	671	5
78	64	2	47	39	N	57	713	58	706	-5	677	669	78	78	641	641	78	641	78	641	5	681	671	5
78	64	2	59	29	N	192	708	192	708	-5	677	669	78	78	641	641	78	641	78	641	5	681	671	5
78	64	3	37	30	S	199	703	199	703	-1	709	717	78	78	641	641	78	641	78	641	5	681	671	5
78	64	3	48	58	S	61	710	61	709	-1	709	717	78	78	641	641	78	641	78	641	5	681	671	5
78	64	4	28	46	N	65	717	65	717	-3	716	723	78	78	641	641	78	641	78	641	5	681	671	5
78	64	4	39	58	N	190	701	190	701	0	675	672	78	78	641	641	78	641	78	641	5	681	671	5
78	64	5	16	44	S	201	690	202	689	9	553	653	78	78	641	641	78	641	78	641	5	681	671	5
78	64	5	28	59	S	62	704	62	705	1	702	713	78	78	641	641	78	641	78	641	5	681	671	5

102

YR			DA			HDDK			HDDK			CDCK			MIDNIGHT			MIDNIGHT			CDCK			MIDNIGHT			
YR	DA	HR	MIN	SEC	PO	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT		
78	68	0	47	0	S	188	628	188	631	3	578	596	78	69	3	578	596	78	69	3	578	596	78	69	3	578	596
78	68	1	3	46	N	73	607	73	616	-14	589	608	78	69	4	55	46	78	69	4	55	46	78	69	4	55	46
78	68	1	35	31	N	60	609	60	616	-14	589	608	78	69	5	3	21	78	69	5	3	21	78	69	5	3	21
78	68	2	27	14	S	193	632	193	637	5	597	615	78	69	5	3	21	78	69	5	3	21	78	69	5	3	21
78	68	2	27	14	S	193	632	193	637	5	597	615	78	69	5	3	21	78	69	5	3	21	78	69	5	3	21
78	68	2	44	22	S	67	614	67	614	-3	604	611	78	69	6	24	1	78	69	6	24	1	78	69	6	24	1
78	68	3	16	45	N	62	602	62	602	5	591	606	78	69	6	24	1	78	69	6	24	1	78	69	6	24	1
78	68	3	34	6	N	190	633	190	634	1	598	612	78	69	7	11	16	78	69	7	11	16	78	69	7	11	16
78	68	4	7	29	S	198	627	198	627	0	591	606	78	69	7	11	16	78	69	7	11	16	78	69	7	11	16
78	68	4	25	43	S	67	583	67	583	20	579	511	78	69	8	4	0	78	69	8	4	0	78	69	8	4	0
78	68	4	57	39	N	69	591	69	591	-1	584	600	78	69	8	4	0	78	69	8	4	0	78	69	8	4	0
78	68	5	14	35	N	191	621	191	620	11	580	613	78	69	9	7	42	78	69	9	7	42	78	69	9	7	42
78	68	5	47	13	S	192	617	192	617	4	590	604	78	69	9	7	42	78	69	9	7	42	78	69	9	7	42
78	68	6	5	13	S	68	601	68	601	4	592	606	78	69	9	7	42	78	69	9	7	42	78	69	9	7	42
78	68	6	39	0	N	73	610	73	610	4	592	606	78	69	9	7	42	78	69	9	7	42	78	69	9	7	42
78	68	6	53	59	N	193	652	193	652	2	612	630	78	69	10	31	48	78	69	10	31	48	78	69	10	31	48
78	68	7	27	37	N	197	629	197	629	14	593	620	78	69	10	31	48	78	69	10	31	48	78	69	10	31	48
78	68	7	45	0	S	70	604	70	604	6	586	602	78	69	11	22	21	78	69	11	22	21	78	69	11	22	21
78	68	8	20	15	N	75	641	75	641	-17	626	617	78	69	11	22	21	78	69	11	22	21	78	69	11	22	21
78	68	8	34	38	N	197	651	197	651	2	618	639	78	69	12	13	55	78	69	12	13	55	78	69	12	13	55
78	68	9	8	38	S	191	648	191	648	5	615	635	78	69	12	13	55	78	69	12	13	55	78	69	12	13	55
78	68	9	24	14	N	75	630	75	630	-36	614	635	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	10	17	1	N	202	608	202	608	19	584	612	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	10	49	49	S	184	649	184	649	2	603	615	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	11	6	45	S	81	572	81	572	0	544	552	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	11	39	50	N	69	632	69	632	5	592	612	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	11	58	8	N	206	622	206	622	5	592	612	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	12	32	23	S	174	651	174	651	5	593	611	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	12	45	37	S	94	634	94	634	-2	603	611	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	13	23	16	N	58	638	58	638	-18	634	625	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	13	39	39	N	208	631	208	631	21	609	620	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	14	26	14	S	197	651	197	651	21	609	620	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	15	6	38	N	51	635	51	635	10	632	640	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	15	20	53	N	211	645	211	645	10	632	640	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	16	8	50	S	210	621	210	621	18	606	638	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	17	3	31	N	51	613	51	613	-9	606	608	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	18	32	4	N	215	644	215	644	7	631	639	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	18	44	30	N	57	582	57	582	-5	572	580	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	20	13	0	N	214	621	214	621	18	606	628	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	20	27	52	N	59	593	59	593	2	624	628	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	21	54	51	N	213	623	213	623	6	623	628	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	22	10	59	N	213	623	213	623	6	623	628	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	22	48	59	S	179	623	179	623	11	539	572	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	23	3	39	S	84	645	84	645	9	625	641	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	23	37	46	N	58	636	58	636	0	632	641	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	23	52	38	N	211	672	211	672	8	622	627	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	0	30	2	S	187	623	187	623	-12	614	613	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	0	45	58	N	75	630	75	630	-12	614	613	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	1	19	31	N	58	642	58	642	-35	636	636	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	1	34	29	N	200	693	200	693	7	677	678	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	2	12	27	N	193	692	193	692	-3	666	662	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	2	25	59	S	67	661	67	661	0	655	655	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	3	15	58	N	191	675	191	675	28	643	673	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0
78	68	3	51	15	S	198	647	198	647	38	614	657	78	69	13	4	0	78	69	13	4	0	78	69	13	4	0

HDDK			CODK			MIDNIGHT			HDDK			CODK			MIDNIGHT		
YR	DA	HR MIN SEC	PO	LT	LAT	YR	DA	HR MIN SEC	PO	LT	LAT	YR	DA	HR MIN SEC	PO	LT	LAT
78	71	7 59 29	N	196	690	78	71	16 9 54	N	220	697	78	71	17 41 18	N	221	702
78	70	8 35 21	S	194	675	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	9 48 42	S	194	675	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	9 41 12	N	201	650	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	10 16 30	S	186	652	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	10 29 10	S	82	678	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	11 6 31	N	61	627	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	12 49 0	N	60	653	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	14 31 45	N	52	639	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	16 28 24	N	212	640	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	17 56 44	N	52	598	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	18 10 34	N	213	630	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	19 40 38	N	50	644	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	19 52 21	N	216	643	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	21 22 43	N	53	657	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	21 35 0	N	217	650	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	22 17 41	S	168	705	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	22 27 58	S	90	676	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	23 4 19	N	55	660	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	23 17 17	N	215	680	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	23 57 51	S	182	690	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	0 10 57	S	78	653	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	0 46 30	N	56	678	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	0 59 44	N	206	699	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	1 38 47	S	191	701	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	1 51 35	S	69	674	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	2 27 19	N	59	662	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	2 41 0	N	195	707	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	3 18 58	S	198	699	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	3 32 58	S	85	641	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	4 8 59	N	65	677	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	4 21 30	N	190	703	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	4 58 53	S	202	697	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	5 12 37	S	65	651	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	5 50 25	N	72	696	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	6 1 45	N	191	701	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	6 39 45	S	201	695	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	7 51 40	S	66	675	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	7 30 40	N	75	686	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	7 41 59	N	195	707	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	8 18 48	S	195	691	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	8 33 42	S	72	622	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	9 22 59	N	200	699	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	10 0 0	S	186	706	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	10 12 5	S	80	654	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	10 50 50	N	70	674	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	11 4 5	N	207	698	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	11 41 56	S	174	709	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	11 53 43	S	90	654	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	12 31 39	N	212	693	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	12 45 32	S	105	677	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	13 33 46	S	52	663	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	14 15 6	N	216	691	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	14 27 23	N	216	691	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702

YR	DA	HDDK	HR	MIN	SEC	FJ	HDDK	LT	LAT	CDDK	DLAT	MIDNIGHT	DLAT	LATH, LAT	MIDNIGHT
78	75	11	22	38	N	69	647	69	648	1	640	651	15	570	598
78	75	11	38	30	N	206	646	207	651	5	625	634	16	590	615
78	75	12	14	3	S	174	680	174	687	7	629	637	85	518	594
78	75	12	26	21	S	94	653	93	652	-1	627	633	16	585	615
78	75	13	4	0	N	61	630	61	631	-9	621	622	22	570	606
78	75	13	20	49	N	208	631	209	641	10	609	625	6	603	615
78	75	13	56	44	S	168	662	163	678	16	591	617	-5	595	596
78	75	14	7	23	S	106	654	104	645	-9	618	611	4	595	605
78	75	14	45	50	N	56	590	55	608	18	581	612	18	541	570
78	75	15	3	1	N	209	619	209	621	2	595	607	5	595	606
78	75	16	45	50	N	207	586	226	714	128	560	709	-3	643	636
78	75	18	11	13	N	55	557	53	589	32	544	592	29	550	591
78	75	18	27	53	N	209	590	210	592	12	553	611	38	590	644
78	75	19	17	40	S	56	594	106	645	0	585	597	6	628	635
78	75	19	54	34	N	213	602	214	612	10	585	602	-1	641	643
78	75	20	9	31	N	59	602	59	601	-1	594	605	-32	657	636
78	75	21	36	23	N	213	610	215	625	15	592	615	-34	663	631
78	75	21	52	13	N	176	650	175	659	9	582	603	-2	639	639
78	75	22	31	16	S	86	637	85	632	-5	616	620	6	617	632
78	75	22	44	59	S	62	587	60	616	29	574	616	30	578	620
78	75	23	17	17	N	208	599	208	598	-1	574	586	18	568	598
78	75	23	36	8	S	186	614	186	623	9	561	588	3	603	618
78	76	0	11	0	S	76	551	76	585	32	528	575	-2	613	613
78	76	0	29	34	S	62	583	51	603	20	570	602	41	518	573
78	76	1	17	58	N	199	621	200	631	10	584	616	0	612	623
78	76	1	52	30	S	193	645	193	642	-3	611	619	2	606	615
78	76	2	9	58	S	70	579	63	594	559	578	592	2	616	628
78	76	2	40	29	N	62	590	62	591	4	578	592	2	609	622
78	76	2	58	39	N	192	631	192	632	1	595	611	3	599	621
78	76	3	32	1	S	197	622	197	619	-3	585	599	7	632	650
78	76	3	49	59	S	67	593	67	593	17	581	618	-40	632	559
78	76	4	22	12	N	67	601	67	618	17	530	618	-1	616	625
78	76	4	39	39	N	191	603	191	608	5	564	589	-4	614	620
78	76	5	11	19	S	199	600	200	611	11	560	598	-15	626	519
78	76	5	30	37	S	69	589	69	589	7	569	587	10	621	635
78	76	6	2	19	N	72	577	72	583	16	557	583	1	611	621
78	76	6	18	18	N	192	657	192	658	-19	625	616	63	573	646
78	76	6	52	0	S	199	622	199	622	20	585	619	80	655	592
78	76	7	9	59	S	69	599	69	614	15	588	614	73	501	592
78	76	7	44	15	N	75	621	75	635	4	604	614	11	571	592
78	76	7	58	59	N	196	651	196	643	-8	618	620	-3	620	622
78	76	8	33	0	S	194	647	194	653	6	614	629	13	608	629
78	76	8	50	17	S	72	590	73	633	43	571	626	24	579	612
78	76	9	40	13	N	200	639	201	653	19	618	640	12	579	602
78	76	10	14	30	N	187	669	187	666	-3	627	629	8	589	607
78	76	10	28	41	S	81	645	80	630	-16	626	618	-1	586	594
78	76	11	4	20	N	71	608	71	622	34	590	636	26	554	589
78	76	11	21	18	N	206	647	206	647	0	627	636	29	544	591
78	76	11	56	59	S	175	689	177	670	-19	643	616	7	577	596
78	76	12	9	39	S	91	643	91	645	-2	614	623	0	558	586
78	76	13	3	45	N	206	626	208	635	9	604	620	-26	586	586
78	76	13	39	19	S	167	655	167	657	1	597	602	2	573	594
78	76	13	49	59	S	105	661	104	660	-1	628	633	9	573	575
78	76	13	49	59	S	105	661	104	660	-1	628	633	-5	582	589

107

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	LT	LAT	DLAT	MIDNIGHT	LATH,LATC	DLAT	MIDNIGHT	LATH,LATC
78	80	8	17	15	N	176	643	76	649	76	643	6	628	644	76	649	628
78	80	8	30	28	N	197	686	197	684	197	684	-2	658	687	197	684	658
78	80	9	6	24	S	192	679	192	674	192	674	-5	650	675	192	674	650
78	80	9	19	48	S	75	671	75	638	75	638	-33	658	632	75	638	658
78	80	9	57	27	N	74	643	74	643	74	643	0	658	637	74	643	658
78	80	10	12	29	N	202	651	202	666	202	666	15	631	648	202	666	631
78	80	10	47	31	S	183	678	184	679	184	679	1	638	642	184	679	638
78	80	11	0	58	S	85	654	84	651	84	651	-3	640	640	84	651	640
78	80	11	53	38	S	208	659	208	652	208	652	-7	651	647	208	652	651
78	80	12	0	23	S	171	694	171	695	171	695	-22	642	642	171	695	642
78	80	12	41	25	S	97	666	95	642	95	642	-8	632	639	95	642	632
78	80	13	19	58	N	210	649	210	652	210	652	3	637	640	210	652	637
78	80	13	35	44	N	107	654	108	655	108	655	1	618	635	108	655	618
78	80	14	23	0	S	212	649	213	658	213	658	9	637	646	213	658	637
78	80	15	17	31	N	45	654	47	646	47	646	-8	645	641	47	646	645
78	80	16	47	39	N	215	657	216	644	216	644	-7	645	641	216	644	645
78	80	16	58	38	N	45	667	49	642	49	642	-25	664	656	49	642	664
78	80	18	30	45	N	217	653	223	690	223	690	37	664	684	223	690	664
78	80	20	12	38	N	49	657	52	647	52	647	-20	664	653	52	647	664
78	80	20	23	1	N	220	653	222	677	222	677	14	659	679	222	677	659
78	80	23	49	3	N	214	678	214	682	214	682	4	669	668	214	682	669
78	80	0	29	21	S	185	708	186	713	186	713	5	673	674	186	713	673
78	80	0	41	58	S	77	651	77	651	77	651	-10	648	646	77	651	648
78	80	1	16	50	N	59	657	60	642	60	642	-15	655	644	60	642	655
78	80	1	30	59	N	203	659	203	695	203	695	-3	683	675	203	695	683
78	80	2	22	39	S	195	689	195	690	195	690	1	661	662	195	690	661
78	80	2	58	52	N	69	670	69	645	69	645	-25	665	642	69	645	665
78	80	3	12	25	N	194	664	194	664	194	664	-34	671	644	194	664	671
78	80	3	49	0	S	200	674	200	674	200	674	-1	657	655	200	674	657
78	80	4	2	38	S	65	674	65	647	65	647	-27	669	650	65	647	669
78	80	4	40	1	N	68	678	68	652	68	652	-26	674	655	68	652	674
78	80	4	52	59	N	191	675	191	675	191	675	0	645	643	191	675	645
78	80	5	27	51	S	201	638	201	649	201	649	11	617	632	201	649	617
78	80	5	43	29	S	67	649	67	648	67	648	-1	642	641	67	648	642
78	80	6	19	59	N	73	650	73	665	73	665	15	636	651	73	665	636
78	80	6	33	20	N	193	664	193	663	193	663	-	633	638	193	663	633
78	80	7	8	28	S	199	660	199	668	199	668	8	628	642	199	668	628
78	80	7	23	19	S	68	652	69	643	69	643	-9	645	643	69	643	645
78	80	7	59	20	N	156	665	156	670	156	670	30	592	634	156	670	592
78	80	8	14	0	N	156	665	156	677	156	677	12	634	650	156	677	634
78	80	8	49	0	S	193	667	193	667	193	667	0	636	642	193	667	636
78	80	9	3	8	S	74	651	74	641	74	641	-20	648	635	74	641	648
78	80	9	56	59	N	201	656	201	625	201	625	29	571	611	201	625	571
78	80	10	29	24	S	187	645	187	643	187	643	-3	599	607	187	643	599
78	80	10	44	59	S	81	623	82	643	82	643	20	631	642	82	643	631
78	80	11	21	1	N	70	646	70	647	70	647	1	631	642	70	647	631
78	80	11	37	1	N	205	642	206	638	206	638	-4	621	632	206	638	621
78	80	12	11	46	S	177	651	177	651	177	651	0	596	605	177	651	596
78	80	12	24	6	S	95	672	95	663	95	663	-9	650	647	95	663	650
78	80	13	2	1	N	209	637	209	646	209	646	26	610	639	209	646	610
78	80	13	19	0	N	209	637	209	637	209	637	1	614	621	209	637	614
78	80	13	56	5	S	163	683	163	683	163	683	1	614	625	163	683	614

YR	DA	HR	MM	SEC	PO	HDOK	LT	LAT	CDOK	DLAT	MIDNIGHT LATH, LANC	DLAT	MIDNIGHT LATH, LANC	CDOK	LT	LAT	HDOK	LT	LAT	CDOK	DLAT	MIDNIGHT LATH, LANC
78	82	21	20	16	N	50	679	58	637	-42	679 642	-1	655 686	191	683	684	191	684	684	191	-1	655 686
78	82	21	31	13	N	219	655	222	661	22	648 674	3	640 683	73	654	654	73	654	654	73	-6	640 683
78	82	22	12	59	S	173	662	172	681	15	601 630	2	627 635	62	630	630	62	630	630	62	-3	627 635
78	82	22	25	1	S	91	668	90	651	-7	645 645	1	660 657	198	655	655	198	655	655	198	-3	660 657
78	82	23	2	12	N	53	690	58	646	-44	691 652	2	651 656	193	633	633	193	633	633	193	9	651 656
78	82	23	15	13	N	214	645	216	665	20	632 652	3	632 652	63	649	649	63	649	649	63	3	632 652
78	82	23	54	1	N	184	668	184	681	13	625 644	3	652 652	65	668	668	65	668	668	65	3	652 652
78	83	0	7	0	S	81	680	80	644	-35	664 644	2	659 673	192	639	639	192	639	639	192	2	659 673
78	83	0	43	30	N	57	685	59	657	-28	686 683	3	667 682	203	684	684	203	684	684	203	-2	667 682
78	83	0	53	10	N	204	647	207	679	32	627 659	6	665 641	67	639	639	67	639	639	67	-31	665 641
78	83	1	34	0	S	193	647	193	681	34	614 654	71	680 692	71	694	694	71	694	694	71	-3	680 692
78	83	1	48	38	S	72	668	72	678	10	655 675	152	684	152	697	697	152	697	697	152	-3	670 685
78	83	2	24	24	N	61	672	60	683	16	667 655	6	694 692	66	687	687	66	687	687	66	-10	694 692
78	83	2	38	28	N	196	682	196	687	5	653 659	75	694 692	75	704	704	75	704	704	75	13	657 699
78	83	3	14	45	S	198	663	194	680	17	632 653	197	694	197	691	691	197	691	691	197	3	663 665
78	83	3	28	17	S	65	690	66	683	-7	687 639	70	674 701	70	702	702	70	702	702	70	17	674 701
78	83	4	6	21	N	66	696	66	683	0	693 703	206	695	206	695	695	206	695	695	206	0	679 674
78	83	4	18	59	N	191	677	192	687	10	647 659	177	714	177	714	714	177	714	714	177	3	683 673
78	83	4	54	36	S	202	658	203	680	22	639 659	94	711	94	711	711	94	711	711	94	-12	698 686
78	83	5	8	30	S	65	681	192	681	2	650 654	211	690	211	690	690	211	690	690	211	2	680 678
78	83	5	59	6	N	192	679	201	674	-21	655 655	107	639	107	639	639	107	639	639	107	2	680 678
78	83	6	34	59	S	501	673	68	634	-21	649 636	215	685	215	685	685	215	685	685	215	3	674 671
78	83	6	49	21	S	67	655	68	634	-21	656 658	41	685	41	685	685	41	685	685	41	2	686 691
78	83	7	26	59	N	75	669	75	680	-2	656 658	219	676	219	676	676	219	676	676	219	3	687 672
78	83	7	39	13	N	195	689	195	687	-2	656 658	222	675	222	675	675	222	675	675	222	-3	677 667
78	83	8	15	29	S	196	686	196	687	-11	658 659	44	685	44	685	685	44	685	685	44	2	686 691
78	83	8	29	9	S	72	662	72	651	0	668 655	222	675	222	675	675	222	675	675	222	-3	677 667
78	83	9	20	5	N	200	685	200	685	0	668 655	48	685	48	685	685	48	685	685	48	-3	693 691
78	83	9	56	36	S	187	699	183	697	-2	663 659	219	656	219	656	656	219	656	656	219	16	645 664
78	83	10	10	0	N	72	650	79	647	-3	636 642	52	689	52	689	689	52	689	689	52	-1	690 696
78	83	10	47	14	N	72	658	71	668	10	644 664	216	670	216	670	670	216	670	670	216	22	636 657
78	83	11	1	8	N	206	697	206	698	1	670 668	181	681	181	681	681	181	681	681	181	11	628 644
78	83	11	1	8	N	175	710	175	711	1	676 666	85	671	85	671	671	85	671	671	85	-25	681 664
78	83	11	28	42	S	93	685	93	686	1	666 679	56	683	56	683	683	56	683	683	56	-7	684 683
78	83	11	49	30	N	212	687	212	688	1	679 674	210	673	210	673	673	210	673	673	210	-3	664 657
78	83	12	28	53	N	212	687	212	688	1	679 674	210	673	210	673	673	210	673	673	210	-3	664 657
78	83	12	42	35	S	101	652	101	652	0	675 659	190	680	190	680	680	190	680	680	190	32	615 653
78	83	13	31	41	N	216	683	216	683	0	675 659	75	681	75	681	681	75	681	681	75	13	655 678
78	83	14	24	24	N	41	688	41	688	0	693 635	60	665	60	665	665	60	665	665	60	-5	665 669
78	83	15	56	36	N	218	679	217	679	0	670 666	198	624	198	624	624	198	624	624	198	-1	615 624
78	83	16	6	20	N	42	679	44	669	-10	681 670	69	609	69	609	609	69	609	609	69	-11	598 599
78	83	17	35	13	N	218	664	218	668	4	654 655	70	598	70	598	598	70	598	598	70	2	574 597
78	83	17	48	45	N	51	637	51	643	6	633 647	192	627	192	627	627	192	627	627	192	1	590 606
78	83	19	19	53	N	217	638	218	649	11	625 637	200	626	200	626	626	200	626	626	200	8	595 612
78	83	19	31	49	N	55	635	55	635	4	636 635	68	606	68	606	606	68	606	606	68	4	591 605
78	83	21	1	29	N	218	647	218	647	0	635 635	70	614	70	614	614	70	614	614	70	-6	597 600
78	83	21	14	12	N	218	647	218	647	0	635 635	192	635	192	635	635	192	635	635	192	-2	602 613
78	83	21	57	1	S	168	692	168	691	-1	639 635	201	631	201	631	631	201	631	631	201	-3	593 616
78	83	22	7	40	S	92	666	92	664	2	642 649	6	604	6	604	604	6	604	604	6	-4	632 637
78	83	22	43	18	N	215	642	215	642	2	641 653	74	643	74	643	643	74	643	643	74	-4	632 637
78	83	22	57	47	N	181	694	181	694	2	657 655	197	614	197	614	614	197	614	614	197	13	576 606
78	83	23	37	48	S	84	664	84	664	-29	668 666	70	655	70	655	655	70	655	655	70	39	599 650
78	83	23	49	38	S	84	664	84	664	-29	668 666	70	655	70	655	655	70	655	655	70	39	599 650
78	84	0	25	0	N	59	650	59	650	-2	647 651	70	655	70	655	655	70	655	655	70	39	599 650
78	84	0	40	30	N	207	657	208	665	8	637 647	70	655	70	655	655	70	655	655	70	39	599 650

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	LT	LAT	MIDNIGHT	DLAT	LATH, LATH	MIDNIGHT
78	85	8	32	20	N	76	634	76	632	-2	618	635	-2	618	635	597
78	85	8	47	27	N	198	630	198	632	3	594	611	3	594	611	591
78	85	9	20	46	S	192	640	192	643	3	606	620	3	606	620	591
78	85	9	36	59	S	76	621	76	631	10	604	624	10	604	624	591
78	85	10	28	28	N	203	635	203	647	12	613	631	12	613	631	591
78	85	11	2	23	S	184	657	183	666	9	613	629	9	613	629	591
78	85	11	17	28	S	85	624	85	636	12	602	625	12	602	625	591
78	85	11	53	32	S	67	642	67	642	-7	634	637	-7	634	637	591
78	85	12	10	0	N	207	636	208	645	19	614	638	19	614	638	591
78	85	12	45	13	S	173	669	176	647	-22	612	658	-22	612	658	591
78	85	12	58	22	S	95	627	95	632	5	595	605	5	595	605	591
78	85	13	35	19	N	59	624	58	636	12	618	641	12	618	641	591
78	85	13	51	40	N	210	639	210	640	1	626	629	1	626	629	591
78	85	14	27	47	S	158	645	166	652	7	563	590	7	563	590	591
78	85	15	17	30	N	55	589	55	591	2	579	590	2	579	590	591
78	85	15	34	15	N	209	617	209	616	-1	594	603	-1	594	603	591
78	85	17	1	19	N	52	599	52	598	-1	591	602	-1	591	602	591
78	85	17	16	57	N	209	586	209	585	-1	560	575	-1	560	575	591
78	85	18	42	19	N	57	549	58	551	2	535	552	2	535	552	591
78	85	18	59	50	N	209	555	211	573	18	526	555	18	526	555	591
78	85	19	38	42	S	162	631	162	628	-3	541	546	-3	541	546	591
78	85	19	50	40	S	95	622	100	624	2	589	590	2	589	590	591
78	85	20	24	20	N	60	550	61	553	3	534	548	3	534	548	591
78	85	20	42	19	N	211	560	211	561	1	538	554	1	538	554	591
78	85	22	7	17	N	61	596	61	596	0	584	594	0	584	594	591
78	85	22	23	51	N	214	610	214	613	3	593	603	3	593	603	591
78	85	23	2	30	S	179	653	180	657	-17	572	561	-17	572	561	591
78	85	23	17	39	S	83	597	82	580	1	584	595	1	584	595	591
78	85	23	48	40	N	63	596	63	597	4	596	609	4	596	609	591
78	85	0	41	45	S	190	608	190	613	5	569	594	5	569	594	591
78	85	1	0	45	S	76	551	76	564	13	528	552	13	528	552	591
78	85	1	29	20	N	64	570	64	563	-7	556	558	-7	556	558	591
78	85	1	50	12	N	197	582	197	582	0	540	566	0	540	566	591
78	85	2	20	45	S	195	562	195	561	-1	517	548	-1	517	548	591
78	85	2	42	18	S	71	535	71	541	6	511	528	6	511	528	591
78	85	3	10	1	N	66	541	66	527	-14	524	519	-14	524	519	591
78	85	3	31	29	N	192	555	192	565	9	511	551	9	511	551	591
78	85	4	1	31	S	198	583	198	576	-7	541	561	-7	541	561	591
78	85	4	21	42	S	69	568	70	564	-4	554	552	-4	554	552	591
78	85	4	53	0	N	70	595	70	580	-15	554	552	-15	554	552	591
78	85	5	10	59	N	192	579	192	584	5	537	568	5	537	568	591
78	85	5	41	30	S	199	582	199	575	-7	540	560	-7	540	560	591
78	85	6	2	30	S	70	556	71	546	-10	534	533	-10	534	533	591
78	85	6	32	55	N	74	563	74	580	17	541	569	17	541	569	591
78	85	6	50	38	N	194	599	193	692	93	559	664	93	559	664	591
78	85	7	22	0	S	197	595	197	591	-4	555	574	-4	555	574	591
78	85	7	41	57	S	71	568	70	581	13	547	571	13	547	571	591
78	85	8	13	45	N	76	576	76	589	13	556	579	13	556	579	591
78	85	8	32	0	N	197	573	197	571	-2	530	555	-2	530	555	591
78	85	9	2	0	S	193	579	193	579	0	537	564	0	537	564	591
78	85	9	21	0	S	74	594	74	602	8	575	593	8	575	593	591
78	85	9	54	46	S	75	608	75	623	21	590	622	21	590	622	591
78	85	10	12	44	N	202	587	202	595	-2	561	575	-2	561	575	591

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK		CDDK		DLAT	MIDNIGHT LATH, LATH	DLAT	MIDNIGHT LATH, LATH	DLAT	MIDNIGHT LATH, LATH	DLAT	MIDNIGHT LATH, LATH		
							LT	LAT	LT	LAT										
78	87	78	87	14	41	3	59	571	59	571	23	532	573	78	87	78	87	14	41	3
78	87	78	87	14	59	59	209	610	209	610	23	586	613	78	87	78	87	14	59	59
78	87	78	87	16	41	59	209	602	211	615	13	577	605	78	87	78	87	16	41	59
78	87	78	87	18	10	6	51	622	54	595	-27	616	598	78	87	78	87	18	10	6
78	87	78	87	18	23	18	215	628	215	628	12	600	617	78	87	78	87	18	23	18
78	87	78	87	19	14	31	107	642	107	642	22	595	631	78	87	78	87	19	14	31
78	87	78	87	19	51	35	56	604	54	636	22	595	631	78	87	78	87	19	51	35
78	87	78	87	20	4	57	217	634	218	642	2	620	631	78	87	78	87	20	4	57
78	87	78	87	21	35	31	52	671	56	644	-27	670	650	78	87	78	87	21	35	31
78	87	78	87	21	46	58	219	660	220	664	4	649	655	78	87	78	87	21	46	58
78	87	78	87	22	30	0	171	705	170	714	9	669	670	78	87	78	87	22	30	0
78	87	78	87	22	41	58	87	630	89	654	24	638	672	78	87	78	87	22	41	58
78	87	78	87	23	17	30	55	684	57	682	-19	685	672	78	87	78	87	23	17	30
78	87	78	87	23	30	13	215	665	216	677	11	656	684	78	87	78	87	23	30	13
78	87	78	87	0	10	29	185	698	185	698	-2	664	660	78	87	78	87	0	10	29
78	87	78	87	0	22	45	81	676	80	656	-30	659	656	78	87	78	87	0	22	45
78	87	78	87	0	58	16	59	665	60	653	-12	664	656	78	87	78	87	0	58	16
78	87	78	87	1	12	40	206	680	206	680	2	654	662	78	87	78	87	1	12	40
78	87	78	87	1	50	30	71	672	72	682	-20	660	667	78	87	78	87	1	50	30
78	87	78	87	2	3	59	62	667	63	645	-22	662	643	78	87	78	87	2	3	59
78	87	78	87	2	39	45	196	678	196	678	3	645	651	78	87	78	87	2	39	45
78	87	78	87	2	54	5	200	669	200	671	-14	651	652	78	87	78	87	2	54	5
78	87	78	87	3	30	19	67	663	67	649	-14	651	652	78	87	78	87	3	30	19
78	87	78	87	3	44	34	68	651	68	651	0	644	654	78	87	78	87	3	44	34
78	87	78	87	4	20	26	192	696	192	696	-2	669	655	78	87	78	87	4	20	26
78	87	78	87	4	33	46	202	659	203	678	19	640	658	78	87	78	87	4	33	46
78	87	78	87	5	9	59	68	630	69	632	2	621	634	78	87	78	87	5	9	59
78	87	78	87	5	25	42	68	630	69	632	2	621	634	78	87	78	87	5	25	42
78	87	78	87	6	2	10	193	666	193	666	-25	669	641	78	87	78	87	6	2	10
78	87	78	87	6	14	47	200	658	200	659	1	639	641	78	87	78	87	6	14	47
78	87	78	87	6	49	56	69	642	69	642	-8	643	644	78	87	78	87	6	49	56
78	87	78	87	7	4	55	68	655	73	625	-29	641	619	78	87	78	87	7	4	55
78	87	78	87	7	41	58	196	645	196	645	12	611	633	78	87	78	87	7	41	58
78	87	78	87	7	55	51	196	645	196	645	-2	626	632	78	87	78	87	7	55	51
78	87	78	87	8	30	8	195	658	195	658	-1	637	645	78	87	78	87	8	30	8
78	87	78	87	8	44	59	200	621	201	624	3	598	610	78	87	78	87	8	44	59
78	87	78	87	9	37	25	189	638	189	631	-7	590	596	78	87	78	87	9	37	25
78	87	78	87	10	10	25	179	594	179	603	5	575	594	78	87	78	87	10	10	25
78	87	78	87	10	27	22	73	581	72	620	39	561	612	78	87	78	87	10	27	22
78	87	78	87	11	0	16	205	608	205	612	4	584	599	78	87	78	87	11	0	16
78	87	78	87	11	19	14	181	634	182	630	-4	585	595	78	87	78	87	11	19	14
78	87	78	87	11	51	54	92	662	91	649	-13	585	595	78	87	78	87	11	51	54
78	87	78	87	12	5	48	65	594	63	636	-13	585	595	78	87	78	87	12	5	48
78	87	78	87	12	42	6	208	624	208	622	-2	601	608	78	87	78	87	12	42	6
78	87	78	87	13	0	27	164	689	164	685	0	634	633	78	87	78	87	13	0	27
78	87	78	87	13	37	3	105	663	101	640	-23	631	603	78	87	78	87	13	37	3
78	87	78	87	13	46	46	211	641	211	641	18	608	630	78	87	78	87	13	46	46
78	87	78	87	14	25	42	210	623	211	641	18	608	630	78	87	78	87	14	25	42
78	87	78	87	14	23	14	213	644	213	644	0	631	631	78	87	78	87	14	23	14
78	87	78	87	16	23	14	53	595	52	606	11	585	610	78	87	78	87	16	23	14
78	87	78	87	17	51	47	213	616	213	616	5	595	606	78	87	78	87	17	51	47
78	87	78	87	18	6	13	52	644	55	619	-25	640	623	78	87	78	87	18	6	13
78	87	78	87	19	35	39	217	638	218	644	6	625	633	78	87	78	87	19	35	39
78	87	78	87	19	47	29	217	638	218	644	6	625	633	78	87	78	87	19	47	29

114

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	COCK	DLAT	MIDNIGHT	LA-TM-LATC	YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	COCK	DLAT	MIDNIGHT	LA-TM-LATC
78	97	23	12	12		S	89	669	60	660	-1	651	664	78	97	23	12	12		S	89	669	60	660	-1	651	664
78	97	23	47	34		N	215	689	216	689	0	681	675	78	97	23	47	34		N	215	689	216	689	0	681	675
78	97	0	0	54		N	159	704	159	704	4	668	670	78	97	0	0	54		N	159	704	159	704	4	668	670
78	98	0	41	29		S	109	704	79	663	-2	652	659	78	98	0	41	29		S	109	704	79	663	-2	652	659
78	98	0	54	12		S	79	665	63	641	-36	673	643	78	98	0	54	12		S	79	665	63	641	-36	673	643
78	98	1	29	38		N	61	677	205	639	10	661	670	78	98	1	29	38		N	61	677	205	639	10	661	670
78	98	1	43	14		N	205	695	199	699	10	661	670	78	98	1	43	14		N	205	695	199	699	10	661	670
78	98	2	21	28		S	198	689	72	630	-41	658	623	78	98	2	21	28		S	198	689	72	630	-41	658	623
78	98	2	34	52		S	71	671	66	653	-41	658	623	78	98	2	34	52		S	71	671	66	653	-41	658	623
78	98	3	10	12		N	196	689	196	704	15	651	674	78	98	3	10	12		N	196	689	196	704	15	651	674
78	98	3	24	23		S	203	679	203	636	-42	637	651	78	98	3	24	23		S	203	679	203	636	-42	637	651
78	98	4	1	19		S	66	690	68	648	-42	637	651	78	98	4	1	19		S	66	690	68	648	-42	637	651
78	98	4	14	19		S	192	699	193	702	3	672	673	78	98	4	14	19		S	192	699	193	702	3	672	673
78	98	5	4	19		S	204	687	204	690	-26	647	629	78	98	5	4	19		S	204	687	204	690	-26	647	629
78	98	5	41	29		S	67	654	68	628	-26	647	629	78	98	5	41	29		S	67	654	68	628	-26	647	629
78	98	5	55	30		S	67	654	68	628	-26	647	629	78	98	5	55	30		S	67	654	68	628	-26	647	629
78	98	6	32	0		S	74	648	75	675	27	634	672	78	98	6	32	0		S	74	648	75	675	27	634	672
78	98	6	44	41		N	194	694	194	698	-4	667	656	78	98	6	44	41		N	194	694	194	698	-4	667	656
78	98	7	21	53		S	201	703	201	701	-2	689	679	78	98	7	21	53		S	201	703	201	701	-2	689	679
78	98	7	35	10		S	69	661	69	654	-7	655	658	78	98	7	35	10		S	69	661	69	654	-7	655	658
78	98	8	13	0		N	78	669	76	667	-2	656	663	78	98	8	13	0		N	78	669	76	667	-2	656	663
78	98	8	25	30		N	198	685	198	705	20	657	675	78	98	8	25	30		N	198	685	198	705	20	657	675
78	98	10	6	20		N	203	687	204	700	13	670	678	78	98	10	6	20		N	203	687	204	700	13	670	678
78	98	10	43	38		S	183	713	183	714	1	679	675	78	98	10	43	38		S	183	713	183	714	1	679	675
78	98	10	54	19		S	88	709	86	681	-28	696	676	78	98	10	54	19		S	88	709	86	681	-28	696	676
78	98	11	47	45		N	20	683	210	694	11	656	680	78	98	11	47	45		N	20	683	210	694	11	656	680
78	98	12	24	59		S	174	684	174	684	-46	636	645	78	98	12	24	59		S	174	684	174	684	-46	636	645
78	98	12	35	1		S	102	707	102	707	-46	636	645	78	98	12	35	1		S	102	707	102	707	-46	636	645
78	98	13	15	53		N	214	678	214	678	12	669	676	78	98	13	15	53		N	214	678	214	678	12	669	676
78	98	13	29	30		N	218	687	218	687	0	679	673	78	98	13	29	30		N	218	687	218	687	0	679	673
78	98	15	10	53		N	47	651	45	671	20	642	673	78	98	15	10	53		N	47	651	45	671	20	642	673
78	98	15	42	18		N	218	689	218	671	2	659	658	78	98	15	42	18		N	218	689	218	671	2	659	658
78	98	16	53	22		N	51	640	51	640	0	636	645	78	98	16	53	22		N	51	640	51	640	0	636	645
78	98	18	24	36		N	218	649	219	652	3	637	640	78	98	18	24	36		N	218	649	219	652	3	637	640
78	98	18	36	3		N	56	626	56	625	-1	620	630	78	98	18	36	3		N	56	626	56	625	-1	620	630
78	98	20	6	6		N	219	646	221	659	13	633	650	78	98	20	6	6		N	219	646	221	659	13	633	650
78	98	20	18	30		N	56	657	58	643	-14	655	649	78	98	20	18	30		N	56	657	58	643	-14	655	649
78	98	21	48	43		N	230	659	231	720	61	655	720	78	98	21	48	43		N	230	659	231	720	61	655	720
78	98	22	1	0		N	173	713	173	713	0	681	659	78	98	22	1	0		N	173	713	173	713	0	681	659
78	98	22	44	8		S	91	679	91	674	-5	658	652	78	98	22	44	8		S	91	679	91	674	-5	658	652
78	98	22	54	29		S	58	669	59	659	-10	668	655	78	98	22	54	29		S	58	669	59	659	-10	668	655
78	98	23	30	39		N	217	678	219	691	13	669	677	78	98	23	30	39		N	217	678	219	691	13	669	677
78	98	23	43	48		S	189	678	188	667	15	638	659	78	98	23	43	48		S	189	678	188	667	15	638	659
78	99	0	35	52		S	82	703	80	634	-69	689	632	78	99	0	35	52		S	82	703	80	634	-69	689	632
78	99	1	12	38		N	60	682	61	671	-11	678	676	78	99	1	12	38		N	60	682	61	671	-11	678	676
78	99	1	26	15		N	207	688	207	691	3	671	670	78	99	1	26	15		N	207	688	207	691	3	671	670
78	99	2	4	14		S	197	681	197	689	8	652	661	78	99	2	4	14		S	197	681	197	689	8	652	661
78	99	2	17	22		S	72	686	73	688	-18	675	683	78	99	2	17	22		S	72	686	73	688	-18	675	683
78	99	2	54	39		N	63	703	64	677	-26	701	660	78	99	2	54	39		N	63	703	64	677	-26	701	660
78	99	3	7	23		N	202	679	203	681	2	662	661	78	99	3	7	23		N	202	679	203	681	2	662	661
78	99	3	44	23		S	67	680	67	680	2	662	661	78	99	3	44	23		S	67	680	67	680	2	662	661
78	99	3	57	43		S	193	663	193	679	16	632	652	78	99	3	57	43		S	193	663	193	679	16	632	652

116

YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	MIDNIGHT LAT, L, LATC	DLAT	LT	LAT	DDK	LT	LAT	DDK	LT	LAT	MIDNIGHT LAT, L, LATC
78	105	10	39	49	S	80	585	37	558	609	36	586	36	586	609	36	586	609	36
78	105	11	12	58	N	73	606	207	645	629	3	643	3	643	629	3	643	629	3
78	105	12	5	59	S	176	689	176	689	626	21	693	21	693	626	21	693	626	21
78	105	12	19	16	S	91	625	91	625	601	21	693	21	693	601	21	693	601	21
78	105	12	54	26	N	65	602	65	602	601	21	693	21	693	601	21	693	601	21
78	105	13	12	6	N	209	635	209	635	615	-1	613	-1	613	615	-1	613	615	-1
78	105	13	14	41	S	167	673	167	673	619	3	608	3	608	619	3	608	619	3
78	105	13	48	41	S	105	654	105	654	640	11	618	11	618	640	11	618	640	11
78	105	13	59	20	S	57	616	57	616	595	-24	609	-24	609	595	-24	609	595	-24
78	105	14	28	0	N	209	605	209	605	613	18	581	18	581	613	18	581	613	18
78	105	14	55	1	N	211	603	211	603	613	7	586	7	586	613	7	586	613	7
78	105	16	36	44	N	55	598	55	598	616	14	589	14	589	616	14	589	616	14
78	105	18	3	56	N	214	609	214	609	628	19	592	19	592	628	19	592	628	19
78	105	19	46	59	N	56	624	56	624	622	-8	618	-8	618	622	-8	618	622	-8
78	105	20	0	21	N	217	616	217	616	632	17	600	17	600	632	17	600	632	17
78	105	21	29	37	N	56	654	56	654	634	-8	651	-8	651	634	-8	651	634	-8
78	105	21	43	22	N	217	614	217	614	624	10	598	10	598	624	10	598	624	10
78	105	22	24	59	S	173	702	171	714	624	12	664	12	664	624	12	664	624	12
78	105	22	35	52	S	92	662	93	669	655	7	638	7	638	655	7	638	655	7
78	105	23	11	0	N	61	651	62	630	651	-21	642	-21	642	651	-21	642	651	-21
78	105	23	26	0	N	15	637	218	665	655	28	623	28	623	655	28	623	655	28
78	105	0	5	3	S	197	683	187	683	655	0	643	0	643	655	0	643	655	0
78	106	0	18	29	S	83	650	83	643	655	-7	630	-7	630	655	-7	630	655	-7
78	106	0	52	0	N	64	637	64	638	655	1	629	1	629	655	1	629	655	1
78	106	1	9	1	N	206	634	207	644	655	10	612	10	612	655	10	612	655	10
78	106	1	45	28	S	197	678	197	657	655	-21	649	-21	649	655	-21	649	655	-21
78	106	1	59	45	S	75	649	75	613	655	-35	635	-35	635	655	-35	635	655	-35
78	106	2	33	59	N	65	651	67	606	655	-45	644	-45	644	655	-45	644	655	-45
78	106	2	49	23	S	198	662	199	683	655	21	630	21	630	655	21	630	655	21
78	106	3	25	15	S	202	662	203	674	655	12	643	12	643	655	12	643	655	12
78	106	3	39	40	S	69	663	70	642	655	-21	657	-21	657	655	-21	657	655	-21
78	106	4	29	36	N	193	665	194	665	655	0	634	0	634	655	0	634	655	0
78	106	5	4	40	S	203	644	203	651	655	-7	623	-7	623	655	-7	623	655	-7
78	106	5	19	48	S	67	658	69	634	655	-24	632	-24	632	655	-24	632	655	-24
78	106	5	56	30	N	73	663	73	650	655	-3	650	-3	650	655	-3	650	655	-3
78	106	6	45	19	S	202	667	202	668	655	1	648	1	648	655	1	648	655	1
78	106	7	0	43	S	69	632	69	642	655	10	624	10	624	655	10	624	655	10
78	106	7	37	30	N	196	671	196	678	655	-39	667	-39	667	655	-39	667	655	-39
78	106	8	25	41	S	196	674	196	656	655	12	644	12	644	655	12	644	655	12
78	106	8	30	24	S	73	669	73	651	655	-18	656	-18	656	655	-18	656	655	-18
78	106	9	30	58	N	201	669	201	669	655	4	646	4	646	655	4	646	655	4
78	106	10	7	0	S	183	693	188	691	655	-2	655	-2	655	655	-2	655	655	-2
78	106	10	19	19	S	83	685	81	650	655	-35	669	-35	669	655	-35	669	655	-35
78	106	10	57	44	N	72	666	73	645	655	-21	657	-21	657	655	-21	657	655	-21
78	106	11	12	46	N	206	647	206	657	655	10	627	10	627	655	10	627	655	10
78	106	11	48	43	S	178	692	177	655	655	-40	642	-40	642	655	-40	642	655	-40
78	106	12	0	44	S	92	666	89	626	655	3	648	3	648	655	3	648	655	3
78	106	12	37	34	N	65	618	65	620	655	2	608	2	608	655	2	608	655	2
78	106	12	54	39	N	209	640	211	660	648	20	619	20	619	648	20	619	648	20
78	106	13	31	1	S	106	670	106	672	655	2	641	2	641	655	2	641	655	2
78	106	13	41	30	S	106	670	106	672	655	2	641	2	641	655	2	641	655	2
78	106	14	20	53	N	57	628	57	628	655	2	641	2	641	655	2	641	655	2

119

120

121

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK		COOK		OLAT	LATH, LANC	YR	DA	HDDK	HR	MIN	SEC	PO	HDDK		COOK		OLAT	LATH, LANC	YR	DA	HDDK	HR	MIN	SEC	PO	HDDK		COOK		OLAT	LATH, LANC
							LT	LAT	LT	LAT										LT	LAT	LT	LAT										LT	LAT	LT	LAT		
78	120	22	13	48	N	65	599	65	599	0	588	538	78	122	78	122	2	59	23	N	197	547	27	524	563													
78	120	22	30	59	N	216	597	216	596	-1	579	587	78	122	78	122	3	21	32	N	197	558	16	495	545													
78	120	23	7	54	S	186	612	186	615	3	559	581	78	122	78	122	3	51	13	S	201	577	4	550	571													
78	120	23	25	0	S	86	574	86	577	3	546	558	78	122	78	122	4	10	59	S	72	579		559	597													
78	121	0	13	59	S	212	603	213	622	13	592	612	78	122	78	122	4	41	29	N	71	570	36	549	597													
78	121	0	49	0	S	195	620	195	625	25	523	622	78	122	78	122	6	40	58	N	194	572	1	529	558													
78	121	0	49	0	S	81	590	82	602	27	564	654	78	122	78	122	7	10	29	S	193	548	7	502	542													
78	121	1	37	29	N	67	620	66	647	27	510	650	78	122	78	122	7	33	26	S	72	526	72	501	585													
78	121	1	56	1	N	203	610	204	640	30	596	624	78	122	78	122	8	1	47	N	77	538	12	501	524													
78	121	2	30	5	S	201	638	201	641	3	617	625	78	122	78	122	8	22	30	S	198	553	15	450	540													
78	121	2	45	59	S	74	631	74	661	30	615	657	78	122	78	122	8	51	0	S	195	556	5	505	543													
78	121	3	18	45	N	69	613	68	656	43	603	660	78	122	78	122	9	42	4	N	77	534		520														
78	121	3	36	20	N	197	619	197	619	0	582	599	78	122	78	122	10	3	30	N	201	542	11	512	546													
78	121	4	9	20	S	203	613	203	616	3	569	603	78	122	78	122	10	32	15	S	190	563	1	519	548													
78	121	4	27	59	S	72	580	72	586	26	560	597	78	122	78	122	10	53	21	S	79	527	-22	502	589													
78	121	5	16	45	N	194	609	194	608	-1	571	589	78	122	78	122	11	23	41	N	73	580	41	560	614													
78	121	5	48	39	S	201	591	201	591	0	565	580	78	122	78	122	11	44	50	S	185	569	2	508	539													
78	121	6	8	12	S	71	580	71	589	9	560	579	78	122	78	122	12	14	0	S	90	593	6	553	561													
78	121	6	39	58	N	75	583	75	603	18	565	594	78	122	78	122	13	4	30	N	67	554	3	539	552													
78	121	6	57	45	N	195	581	195	585	4	539	569	78	122	78	122	13	26	28	N	206	562	15	533	567													
78	121	7	28	25	S	198	582	198	589	7	540	572	78	122	78	122	13	58	20	S	176	618	4	531	558													
78	121	10	18	39	N	203	603	203	610	1	585	597	78	122	78	122	14	15	19	S	96	542	28	493	524													
78	121	10	51	28	S	187	634	187	642	8	585	607	78	122	78	122	14	47	40	N	61	557	27	542	581													
78	121	11	8	46	S	82	577	83	602	25	550	586	78	122	78	122	15	7	52	N	208	572	3	544	566													
78	121	11	40	58	N	71	585	71	592	7	565	582	78	122	78	122	15	41	30	S	172	610	5	559	549													
78	121	12	0	0	N	207	615	207	620	5	591	606	78	122	78	122	15	57	54	S	101	546		459														
78	121	12	32	28	S	182	605	182	606	1	551	572	78	127	78	127	16	49	17	N	52	627	53	622	628													
78	121	12	51	12	S	88	534	90	573	39	502	526	78	127	78	127	17	2	37	N	215	638	5	625	632													
78	121	13	20	31	N	67	509	67	526	17	490	518	78	127	78	127	18	31	30	N	57	610	16	603	631													
78	121	14	16	13	S	206	535	206	565	10	526	556	78	127	78	127	23	52	31	N	219	664	10	654	666													
78	121	14	33	18	S	174	626	175	620	-6	544	555	78	128	78	128	0	32	19	S	192	635	-1	668	665													
78	121	15	5	28	S	96	483	94	504	21	418	432	78	128	78	128	0	43	31	S	86	717	84	705	617													
78	121	15	25	34	N	60	564	59	580	16	549	583	78	128	78	128	1	35	0	N	209	669	210	683	14	651	669											
78	121	16	13	46	S	106	583	106	602	19	514	548	78	128	78	128	2	11	59	S	201	666	201	663	-3	647	645											
78	121	17	6	59	N	210	566	212	595	29	544	586	78	128	78	128	3	2	8	N	75	659	76	660	689	555												
78	121	18	32	15	N	59	576	55	627	51	555	632	78	128	78	128	3	16	20	N	199	659	68	665	-25	687	669											
78	121	18	48	30	S	214	577	216	598	21	557	589	78	128	78	128	4	52	54	S	206	659	199	666	7	627	641											
78	121	19	38	56	S	54	550	63	641	22	534	568	78	128	78	128	4	5	23	S	69	680	206	688	-2	674	658											
78	121	20	13	30	N	215	578	217	596	18	558	587	78	128	78	128	4	43	28	N	71	699	71	691	0	687	697											
78	121	20	30	59	N	68	529	67	558	29	511	553	78	128	78	128	4	55	19	N	194	701	194	704	3	689	689											
78	121	21	54	19	N	213	533	213	532	-1	508	527	78	128	78	128	5	32	59	S	205	695	206	696	1	679	675											
78	121	22	15	38	S	185	565	185	565	23	476	533	78	128	78	128	5	45	36	S	67	680	67	674	-6	676	679											
78	121	22	48	24	S	85	518	85	510	-6	484	482	78	128	78	128	6	23	59	N	75	681	75	681	-9	679	678											
78	121	23	9	16	S	85	518	85	510	-6	484	482	78	128	78	128	6	35	20	N	194	707	194	707	0	681	677											
78	121	23	35	21	N	71	520	71	527	7	495	512	78	128	78	128	7	12	59	S	202	698	202	694	-4	682	673											
78	121	23	58	35	N	210	551	210	551	-2	522	545	78	128	78	128	7	25	40	S	69	677	77	699	18	673	697											
78	122	0	30	15	S	81	524	82	554	30	522	550	78	128	78	128	8	4	11	N	77	681	77	699	18	669	697											
78	122	1	17	0	N	71	525	71	525	-3	500	507	78	128	78	128	8	15	59	N	197	701	197	700	-1	675	671											
78	122	1	40	57	S	202	542	203	549	7	512	542	78	128	78	128	9	6	0	S	195	700	195	704	4	673	674											
78	122	2	9	43	S	199	533	200	537	4	485	531	78	128	78	128	9	56	59	N	203	695	203	700	5	662	678											
78	122	2	31	59	S	77	531	77	529	-2	507	515	78	128	78	128	10	34	7	N	186	695	186	699	4	658	661											

YR DA		HCDK		HDCX		CDDK		MIDNIGHT		MIDNIGHT	
YR	DA	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT
78	135	15	0 42	215	664	217	672	64	681	64	681
78	134	16	42 45	218	656	218	656	215	681	215	681
78	134	18	11 51	219	632	219	632	199	683	199	683
78	134	18	25 29	219	632	219	632	199	683	199	683
78	134	19	53 58	219	632	219	632	199	683	199	683
78	134	20	8 37	219	632	219	632	199	683	199	683
78	134	21	35 16	219	632	219	632	199	683	199	683
78	134	22	35 12	219	632	219	632	199	683	199	683
78	135	0	12 29	219	632	219	632	199	683	199	683
78	135	0	26 30	219	632	219	632	199	683	199	683
78	135	1	0 12	219	632	219	632	199	683	199	683
78	135	1	16 21	219	632	219	632	199	683	199	683
78	135	2	7 59	219	632	219	632	199	683	199	683
78	135	2	42 28	219	632	219	632	199	683	199	683
78	135	3	33 39	219	632	219	632	199	683	199	683
78	135	3	47 42	219	632	219	632	199	683	199	683
78	135	4	23 36	219	632	219	632	199	683	199	683
78	135	5	13 36	219	632	219	632	199	683	199	683
78	135	5	27 22	219	632	219	632	199	683	199	683
78	135	6	17 10	219	632	219	632	199	683	199	683
78	135	6	55 44	219	632	219	632	199	683	199	683
78	135	7	6 18	219	632	219	632	199	683	199	683
78	135	7	45 58	219	632	219	632	199	683	199	683
78	135	8	34 0	219	632	219	632	199	683	199	683
78	135	8	46 7	219	632	219	632	199	683	199	683
78	135	9	38 47	219	632	219	632	199	683	199	683
78	135	10	14 9	219	632	219	632	199	683	199	683
78	135	10	27 4	219	632	219	632	199	683	199	683
78	135	11	6 0	219	632	219	632	199	683	199	683
78	135	11	20 0	219	632	219	632	199	683	199	683
78	135	11	57 18	219	632	219	632	199	683	199	683
78	135	12	8 1	219	632	219	632	199	683	199	683
78	135	12	46 59	219	632	219	632	199	683	199	683
78	135	13	1 25	219	632	219	632	199	683	199	683
78	135	14	28 57	219	632	219	632	199	683	199	683
78	135	14	42 15	219	632	219	632	199	683	199	683
78	135	16	24 59	219	632	219	632	199	683	199	683
78	135	17	55 51	219	632	219	632	199	683	199	683
78	135	18	7 13	219	632	219	632	199	683	199	683
78	135	19	38 19	219	632	219	632	199	683	199	683
78	135	19	49 25	219	632	219	632	199	683	199	683
78	135	21	31 59	219	632	219	632	199	683	199	683
78	135	22	16 14	219	632	219	632	199	683	199	683
78	135	22	26 16	219	632	219	632	199	683	199	683
78	135	23	2 13	219	632	219	632	199	683	199	683
78	135	23	14 39	219	632	219	632	199	683	199	683
78	135	23	56 16	219	632	219	632	199	683	199	683
78	136	0	8 20	219	632	219	632	199	683	199	683

129

130

131

132

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	COOK	DLAT	MIDNIGHT LAT	DLAT	MIDNIGHT LAT	COOK	LT	LAT	DLAT	MIDNIGHT LAT
78	154	15	9	16	S	65	674	109	624	-47	665	-3	594	210	620	610	3	594
78	155	0	20	35	N	65	674	69	627	-47	665	-3	591	167	627	602	3	591
78	155	0	35	1	N	217	665	413	669	4	655	-3	593	106	633	602	4	593
78	155	1	12	59	S	198	674	198	675	-36	653	4	602	55	640	645	4	602
78	155	1	26	20	S	83	670	83	674	-36	653	4	602	213	622	612	4	602
78	155	2	2	19	N	67	682	68	681	-21	673	11	634	51	649	655	11	634
78	155	2	17	0	N	205	666	206	662	-4	647	21	623	220	653	649	21	623
78	155	3	7	25	S	204	641	204	642	-4	647	-33	639	56	637	642	-33	639
78	155	3	7	25	S	75	656	75	650	-6	642	7	635	223	649	639	7	635
78	155	5	22	39	N	72	619	72	621	-6	642	9	627	58	653	653	9	627
78	155	5	38	24	N	194	641	193	655	15	607	22	634	224	644	634	22	634
78	155	10	24	20	N	75	655	75	623	-12	619	2	657	60	655	669	2	657
78	155	10	40	54	N	203	626	204	641	15	604	3	622	222	634	622	3	622
78	155	11	14	44	S	184	657	184	659	2	613	4	615	184	653	627	4	615
78	155	11	29	0	S	86	638	86	638	0	617	-21	735	100	713	711	-21	735
78	155	12	4	21	N	69	612	69	618	6	602	0	634	67	642	644	0	634
78	155	12	22	25	N	207	628	208	632	4	606	5	611	218	631	626	5	611
78	155	12	56	35	S	177	643	176	651	6	574	-2	599	195	650	607	-2	599
78	155	13	11	32	S	93	594	95	623	29	554	0	601	70	618	610	0	601
78	155	15	29	28	N	58	556	56	622	26	597	2	545	205	552	545	2	545
78	155	22	18	9	N	69	569	69	562	13	605	2	637	203	659	641	2	637
78	155	22	36	42	N	219	592	215	593	-7	585	-14	635	78	643	619	-14	635
78	155	23	12	24	S	189	598	189	594	6	533	3	639	200	658	643	3	639
78	155	23	31	20	S	97	531	88	591	30	499	-2	645	205	662	644	-2	645
78	155	0	1	18	N	69	620	71	580	-40	610	-17	653	72	649	614	-17	653
78	156	0	20	29	N	213	593	213	586	-7	559	16	655	191	662	655	16	655
78	156	0	53	38	S	192	593	192	592	29	561	-1	668	205	684	664	-1	668
78	156	1	11	31	S	84	587	84	616	29	561	5	649	68	650	652	5	649
78	156	3	22	11	N	72	584	72	573	19	532	10	623	202	654	637	10	623
78	156	4	13	31	N	199	581	198	585	4	539	0	626	187	663	631	0	626
78	156	4	33	39	S	203	576	203	576	0	549	-12	635	83	642	632	-12	635
78	156	5	4	7	N	72	573	73	564	1	552	3	618	71	648	643	3	618
78	156	5	23	11	N	194	579	194	574	17	537	1	635	207	639	626	1	635
78	156	5	53	20	S	200	568	201	574	6	540	-19	635	176	665	634	-19	635
78	156	6	13	30	S	71	576	70	598	22	556	8	590	92	625	596	8	590
78	156	6	45	26	N	75	550	75	595	39	525	25	610	65	600	599	25	610
78	156	7	3	39	N	194	569	194	608	39	548	88	628	220	729	726	88	628
78	156	7	34	3	S	198	593	198	592	0	574	2	636	100	594	536	2	636
78	156	7	52	40	S	71	593	71	591	-2	574	14	612	56	635	636	14	612
78	156	8	26	15	N	77	603	77	614	11	585	2	628	100	594	536	2	628
78	156	8	43	59	N	198	578	198	596	18	535	15	637	56	635	640	15	637
78	156	9	14	43	S	194	577	194	599	2	557	3	637	207	642	640	3	637
78	156	9	33	29	S	75	576	75	576	20	556	15	637	215	654	651	15	637
78	156	10	5	22	S	75	570	75	598	20	556	3	635	53	634	638	3	635
78	156	10	24	30	N	202	599	202	607	28	545	24	639	221	675	667	24	639
78	156	10	56	17	S	188	616	197	622	8	574	9	610	57	609	613	9	610
78	156	11	13	57	S	81	574	83	605	31	546	1	545	65	561	556	1	545
78	156	11	46	23	N	71	599	71	605	18	570	14	612	223	636	625	14	612
78	156	12	5	18	N	207	622	207	628	6	559	26	556	65	596	594	26	556
78	156	12	39	29	S	177	656	177	660	4	591	31	546	222	625	587	31	546
78	156	12	53	29	S	93	617	93	619	2	582	4	593	94	618	587	4	593
78	156	13	29	14	N	63	615	62	635	20	605	68	593	68	608	607	68	593

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	CDOK	DLAT	MIDNIGHT	DLAT	LAT	LATC
78 158	23	26	22	N	219	621	220	627	6	605	618	6	605	618	618
78 158	0	3	45	S	192	650	192	649	-1	617	626	-1	617	626	626
78 159	0	18	54	S	87	614	88	623	9	591	610	9	591	610	610
78 159	0	51	36	N	69	635	68	643	8	627	646	8	627	646	646
78 159	1	8	55	N	212	634	213	648	14	620	636	14	620	636	636
78 159	2	33	23	S	201	653	201	648	-5	633	631	-5	633	631	631
78 159	2	33	23	S	81	603	81	622	19	578	609	19	578	609	609
78 159	2	50	14	N	70	643	70	638	-4	638	633	-4	638	633	633
78 159	3	23	40	S	202	635	202	638	3	613	622	3	613	622	622
78 159	3	40	35	S	204	616	204	624	8	593	610	8	593	610	610
78 159	4	13	30	S	74	620	74	620	10	603	623	10	603	623	623
78 159	4	30	30	N	71	605	71	620	15	587	612	15	587	612	612
78 159	5	3	34	S	195	636	195	646	10	601	623	10	601	623	623
78 159	5	55	35	S	203	612	203	614	2	588	601	2	588	601	601
78 159	6	10	50	N	73	641	69	639	-1	626	634	-1	626	634	634
78 159	7	2	42	S	193	638	193	631	3	592	610	3	592	610	610
78 159	7	35	29	S	201	625	201	647	21	604	631	21	604	631	631
78 159	7	50	34	N	71	617	70	610	39	550	602	39	550	602	602
78 159	8	25	6	N	76	617	76	626	9	600	619	9	600	619	619
78 159	8	29	38	S	196	650	195	677	27	617	650	27	617	650	650
78 159	9	16	44	S	197	651	197	671	12	627	645	12	627	645	645
78 159	9	31	7	S	72	651	72	636	-15	637	630	-15	637	630	630
78 159	10	6	53	N	200	658	201	667	9	638	649	9	638	649	649
78 159	10	18	9	N	189	698	189	705	7	661	667	7	661	667	667
78 159	10	57	29	N	82	707	79	636	-71	693	530	-71	693	530	530
78 159	11	12	39	N	72	689	72	675	6	656	672	6	656	672	672
78 159	11	48	58	N	205	647	205	674	27	627	655	27	627	655	655
78 159	11	59	16	S	175	711	175	719	8	678	676	8	678	676	676
78 159	12	38	59	S	94	694	90	647	-47	677	626	-47	677	626	626
78 159	12	54	7	N	63	675	62	686	11	670	692	11	670	692	692
78 159	14	21	7	N	210	651	212	683	32	639	669	32	639	669	669
78 159	14	35	12	N	57	652	56	655	3	649	661	3	649	661	661
78 159	16	3	50	N	216	668	217	677	9	658	664	9	658	664	664
78 159	16	17	39	N	54	628	55	613	-10	623	622	-10	623	622	622
78 159	17	45	49	N	217	650	217	656	16	638	644	16	638	644	644
78 159	18	0	14	N	58	594	57	612	18	585	616	18	585	616	616
78 159	19	28	0	N	219	623	219	633	5	613	622	5	613	622	622
78 159	19	42	16	N	62	586	60	615	29	573	615	29	573	615	615
78 159	21	11	11	N	222	631	222	635	4	622	624	4	622	624	624
78 159	21	24	31	N	62	629	62	625	-4	626	626	-4	626	626	626
78 159	22	7	59	N	224	643	225	654	11	636	645	11	636	645	645
78 159	22	18	4	S	170	712	171	711	-1	680	656	-1	680	656	656
78 159	22	53	42	S	98	649	98	656	-7	622	538	-7	622	538	538
78 159	23	7	12	N	63	658	65	644	-14	652	647	-14	652	647	647
78 159	23	47	38	S	224	661	225	672	21	657	664	21	657	664	664
78 159	23	58	43	S	189	683	187	705	22	643	657	22	643	657	657
78 159	0	35	18	S	93	707	91	678	-25	693	668	-25	693	668	668
78 160	0	50	41	N	66	661	67	654	-7	655	658	-7	655	658	658
78 160	1	28	20	N	215	657	218	659	32	646	675	32	646	675	675
78 160	1	41	24	S	199	685	199	700	15	657	671	15	657	671	671
78 160	3	58	24	S	82	671	82	664	-7	654	656	-7	654	656	656
78 160	3	58	24	N	70	672	70	675	3	650	672	3	650	672	672

136

YR	DA	HR	MM	SEC	PO	HODX	LT	LAT	COYK	DLAT	LATH, LATIC	YR	DA	HR	MM	SEC	PO	HODX	LT	LAT	COYK	DLAT	LATH, LATIC	YR	DA	HR	MM	SEC	PO	HODX	LT	LAT	COYK	DLAT	LATH, LATIC	YR	DA	HR	MM	SEC	PO	HODX	LT	LAT	COYK	DLAT	LATH, LATIC
78	174	0	12	32	N	217	623	197	629	197	629	78	175	0	12	32	N	217	623	197	629	197	629	78	175	0	12	32	N	217	623	197	629	197	629	78	175	0	12	32	N	217	623	197	629	197	629
78	174	0	49	3	S	196	560	197	629	197	629	78	175	0	49	3	S	196	560	197	629	197	629	78	175	0	49	3	S	196	560	197	629	197	629	78	175	0	49	3	S	196	560	197	629	197	629
78	174	1	3	47	S	85	633	197	629	197	629	78	175	1	3	47	S	85	633	197	629	197	629	78	175	1	3	47	S	85	633	197	629	197	629	78	175	1	3	47	S	85	633	197	629	197	629
78	174	3	17	59	N	71	617	197	629	197	629	78	175	3	17	59	N	71	617	197	629	197	629	78	175	3	17	59	N	71	617	197	629	197	629	78	175	3	17	59	N	71	617	197	629	197	629
78	174	3	35	59	N	199	608	197	629	197	629	78	175	3	35	59	N	199	608	197	629	197	629	78	175	3	35	59	N	199	608	197	629	197	629	78	175	3	35	59	N	199	608	197	629	197	629
78	174	4	9	0	S	204	637	197	629	197	629	78	175	4	9	0	S	204	637	197	629	197	629	78	175	4	9	0	S	204	637	197	629	197	629	78	175	4	9	0	S	204	637	197	629	197	629
78	174	4	25	25	S	72	620	197	629	197	629	78	175	4	25	25	S	72	620	197	629	197	629	78	175	4	25	25	S	72	620	197	629	197	629	78	175	4	25	25	S	72	620	197	629	197	629
78	174	5	0	40	N	72	665	197	629	197	629	78	175	5	0	40	N	72	665	197	629	197	629	78	175	5	0	40	N	72	665	197	629	197	629	78	175	5	0	40	N	72	665	197	629	197	629
78	174	5	15	15	N	194	639	197	629	197	629	78	175	5	15	15	N	194	639	197	629	197	629	78	175	5	15	15	N	194	639	197	629	197	629	78	175	5	15	15	N	194	639	197	629	197	629
78	174	6	3	53	S	67	663	197	629	197	629	78	175	6	3	53	S	67	663	197	629	197	629	78	175	6	3	53	S	67	663	197	629	197	629	78	175	6	3	53	S	67	663	197	629	197	629
78	174	6	41	49	N	74	678	197	629	197	629	78	175	6	41	49	N	74	678	197	629	197	629	78	175	6	41	49	N	74	678	197	629	197	629	78	175	6	41	49	N	74	678	197	629	197	629
78	174	6	54	58	N	134	556	197	629	197	629	78	175	6	54	58	N	134	556	197	629	197	629	78	175	6	54	58	N	134	556	197	629	197	629	78	175	6	54	58	N	134	556	197	629	197	629
78	174	7	30	0	S	200	672	197	629	197	629	78	175	7	30	0	S	200	672	197	629	197	629	78	175	7	30	0	S	200	672	197	629	197	629	78	175	7	30	0	S	200	672	197	629	197	629
78	174	7	43	57	S	69	660	197	629	197	629	78	175	7	43	57	S	69	660	197	629	197	629	78	175	7	43	57	S	69	660	197	629	197	629	78	175	7	43	57	S	69	660	197	629	197	629
78	174	8	22	35	N	76	681	197	629	197	629	78	175	8	22	35	N	76	681	197	629	197	629	78	175	8	22	35	N	76	681	197	629	197	629	78	175	8	22	35	N	76	681	197	629	197	629
78	174	8	35	30	N	197	656	197	629	197	629	78	175	8	35	30	N	197	656	197	629	197	629	78	175	8	35	30	N	197	656	197	629	197	629	78	175	8	35	30	N	197	656	197	629	197	629
78	174	9	9	58	S	194	658	197	629	197	629	78	175	9	9	58	S	194	658	197	629	197	629	78	175	9	9	58	S	194	658	197	629	197	629	78	175	9	9	58	S	194	658	197	629	197	629
78	174	10	0	19	S	74	603	197	629	197	629	78	175	10	0	19	S	74	603	197	629	197	629	78	175	10	0	19	S	74	603	197	629	197	629	78	175	10	0	19	S	74	603	197	629	197	629
78	174	10	17	1	N	202	627	197	629	197	629	78	175	10	17	1	N	202	627	197	629	197	629	78	175	10	17	1	N	202	627	197	629	197	629	78	175	10	17	1	N	202	627	197	629	197	629
78	174	10	51	8	S	186	664	197	629	197	629	78	175	10	51	8	S	186	664	197	629	197	629	78	175	10	51	8	S	186	664	197	629	197	629	78	175	10	51	8	S	186	664	197	629	197	629
78	174	11	8	0	S	80	562	197	629	197	629	78	175	11	8	0	S	80	562	197	629	197	629	78	175	11	8	0	S	80	562	197	629	197	629	78	175	11	8	0	S	80	562	197	629	197	629
78	174	11	40	0	N	72	584	197	629	197	629	78	175	11	40	0	N	72	584	197	629	197	629	78	175	11	40	0	N	72	584	197	629	197	629	78	175	11	40	0	N	72	584	197	629	197	629
78	174	11	59	0	N	206	521	197	629	197	629	78	175	11	59	0	N	206	521	197	629	197	629	78	175	11	59	0	N	206	521	197	629	197	629	78	175	11	59	0	N	206	521	197	629	197	629
78	174	12	33	58	S	174	688	197	629	197	629	78	175	12	33	58	S	174	688	197	629	197	629	78	175	12	33	58	S	174	688	197	629	197	629	78	175	12	33	58	S	174	688	197	629	197	629
78	174	12	46	45	S	92	628	197	629	197	629	78	175	12	46	45	S	92	628	197	629	197	629	78	175	12	46	45	S	92	628	197	629	197	629	78	175	12	46	45	S	92	628	197	629	197	629
78	174	13	22	57	N	63	618	197	629	197	629	78	175	13	22	57	N	63	618	197	629	197	629	78	175	13	22	57	N	63	618	197	629	197	629	78	175	13	22	57	N	63	618	197	629	197	629
78	174	13	40	0	N	211	643	197	629	197	629	78	175	13	40	0	N	211	643	197	629	197	629	78	175	13	40	0	N	211	643	197	629	197	629	78	175	13	40	0	N	211	643	197	629	197	629
78	174	14	27	20	S	106	643	197	629	197	629	78	175	14	27	20	S	106	643	197	629	197	629	78	175	14	27	20	S	106	643	197	629	197	629	78	175	14	27	20	S	106	643	197	629	197	629
78	174	16	49	0	N	57	597	197	629	197	629	78	175	16	49	0	N	57	597	197	629	197	629	78	175	16	49	0	N	57	597	197	629	197	629	78	175	16	49	0	N	57	597	197	629	197	629
78	174	17	3	53	N	216	632	197	629	197	629	78	175	17	3	53	N	216	632	197	629	197	629	78	175	17	3	53	N	216	632	197	629	197	629	78	175	17	3	53	N	216	632	197	629	197	629
78	174	18	31	29	N	60	584	197	629	197	629	78	175	18	31	29	N	60	584	197	629	197	629	78	175	18	31	29	N	60	584	197	629	197	629	78	175	18	31	29	N	60	584	197	629	197	629
78	174	18	46	43	N	218	604	197	629	197	629	78	175	18	46	43	N	218	604	197	629	197	629	78	175	18	46	43	N	218	604	197	629	197	629	78	175	18	46	43	N	218	604	197	629	197	629
78	174	20	13	0	N	65	565	197	629	197	629	78	175	20	13	0	N	65	565	197	629	197	629	78	175	20	13	0	N	65	565	197	629	197	629	78	175	20	13	0	N	65	565	197	629	197	629
78	174	23	36	57	N	70	597	197	629	197	629	78	175	23	36	57	N	70	597	197	629	197	629	78	175	23	36	57	N	70	597	197	629	197	629	78	175	23	36	57	N	70	597				

141

HDDK				COCK				MIDNIGHT				HDDK				COCK				MIDNIGHT											
YR	DA	HR	NN SEC	PO	LT	LAT	DLAT	YR	DA	HR	NN SEC	PO	LT	LAT	DLAT	YR	DA	HR	NN SEC	PO	LT	LAT	DLAT	YR	DA	HR	NN SEC	PO	LT	LAT	DLAT
78	185	20	27	N	62	611	8	78	185	20	27	N	221	619	16	78	185	20	27	N	221	619	16	78	185	20	27	N	221	619	16
78	185	20	42	N	219	595	11	78	185	20	42	N	180	581	0	78	185	20	42	N	180	581	0	78	185	20	42	N	180	581	0
78	185	22	9	N	65	616	5	78	185	22	9	N	93	588	40	78	185	22	9	N	93	588	40	78	185	22	9	N	93	588	40
78	185	22	25	N	220	509	12	78	185	22	25	N	67	629	3	78	185	22	25	N	67	629	3	78	185	22	25	N	67	629	3
78	185	23	2	S	187	616	5	78	185	23	2	S	230	639	6	78	185	23	2	S	230	639	6	78	185	23	2	S	230	639	6
78	185	23	19	S	91	601	5	78	185	23	19	S	194	630	2	78	185	23	19	S	194	630	2	78	185	23	19	S	194	630	2
78	185	23	48	N	72	564	552	78	185	23	48	N	87	638	6	78	185	23	48	N	87	638	6	78	185	23	48	N	87	638	6
78	186	0	9	N	214	580	-1	78	186	0	9	N	69	639	6	78	186	0	9	N	69	639	6	78	186	0	9	N	69	639	6
78	186	0	42	S	197	599	3	78	186	0	42	S	211	645	7	78	186	0	42	S	211	645	7	78	186	0	42	S	211	645	7
78	186	1	29	N	84	519	-3	78	186	1	29	N	79	660	-2	78	186	1	29	N	79	660	-2	78	186	1	29	N	79	660	-2
78	186	1	51	N	206	573	26	78	186	1	51	N	202	669	14	78	186	1	51	N	202	669	14	78	186	1	51	N	202	669	14
78	186	2	22	S	202	564	-5	78	186	2	22	S	205	670	6	78	186	2	22	S	205	670	6	78	186	2	22	S	205	670	6
78	186	2	42	N	79	567	28	78	186	2	42	N	72	657	3	78	186	2	42	N	72	657	3	78	186	2	42	N	72	657	3
78	186	3	11	N	198	560	9	78	186	3	11	N	195	670	19	78	186	3	11	N	195	670	19	78	186	3	11	N	195	670	19
78	186	4	1	S	202	543	0	78	186	4	1	S	206	689	1	78	186	4	1	S	206	689	1	78	186	4	1	S	206	689	1
78	186	4	23	S	74	548	23	78	186	4	23	S	68	652	-8	78	186	4	23	S	68	652	-8	78	186	4	23	S	68	652	-8
78	186	4	52	N	72	545	-3	78	186	4	52	N	74	650	-3	78	186	4	52	N	74	650	-3	78	186	4	52	N	74	650	-3
78	186	5	14	N	194	531	14	78	186	5	14	N	202	680	-3	78	186	5	14	N	202	680	-3	78	186	5	14	N	202	680	-3
78	186	5	42	S	200	548	5	78	186	5	42	S	69	637	-7	78	186	5	42	S	69	637	-7	78	186	5	42	S	69	637	-7
78	186	6	4	S	72	533	12	78	186	6	4	S	76	680	-23	78	186	6	4	S	76	680	-23	78	186	6	4	S	76	680	-23
78	186	6	34	N	194	555	11	78	186	6	34	N	196	684	-23	78	186	6	34	N	196	684	-23	78	186	6	34	N	196	684	-23
78	186	7	21	S	198	529	4	78	186	7	21	S	196	692	-1	78	186	7	21	S	196	692	-1	78	186	7	21	S	196	692	-1
78	186	7	45	N	72	523	28	78	186	7	45	N	73	670	-1	78	186	7	45	N	73	670	-1	78	186	7	45	N	73	670	-1
78	186	8	14	S	76	553	1	78	186	8	14	S	75	662	-7	78	186	8	14	S	75	662	-7	78	186	8	14	S	75	662	-7
78	186	8	33	N	197	556	19	78	186	8	33	N	202	685	-6	78	186	8	33	N	202	685	-6	78	186	8	33	N	202	685	-6
78	186	9	3	S	195	567	13	78	186	9	3	S	187	697	3	78	186	9	3	S	187	697	3	78	186	9	3	S	187	697	3
78	186	9	24	N	73	538	12	78	186	9	24	N	83	692	-30	78	186	9	24	N	83	692	-30	78	186	9	24	N	83	692	-30
78	186	9	55	N	76	570	27	78	186	9	55	N	71	660	-7	78	186	9	55	N	71	660	-7	78	186	9	55	N	71	660	-7
78	186	10	13	S	201	598	14	78	186	10	13	S	207	685	-8	78	186	10	13	S	207	685	-8	78	186	10	13	S	207	685	-8
78	186	10	45	N	189	608	14	78	186	10	45	N	175	700	-37	78	186	10	45	N	175	700	-37	78	186	10	45	N	175	700	-37
78	186	11	4	S	79	540	66	78	186	11	4	S	93	653	-5	78	186	11	4	S	93	653	-5	78	186	11	4	S	93	653	-5
78	186	11	36	N	72	599	8	78	186	11	36	N	63	649	15	78	186	11	36	N	63	649	15	78	186	11	36	N	63	649	15
78	186	11	56	N	204	575	6	78	186	11	56	N	214	687	4	78	186	11	56	N	214	687	4	78	186	11	56	N	214	687	4
78	186	12	26	S	183	593	0	78	186	12	26	S	57	696	26	78	186	12	26	S	57	696	26	78	186	12	26	S	57	696	26
78	186	12	42	N	92	613	17	78	186	12	42	N	57	634	8	78	186	12	42	N	57	634	8	78	186	12	42	N	57	634	8
78	186	13	16	S	66	560	32	78	186	13	16	S	218	682	220	78	186	13	16	S	218	682	220	78	186	13	16	S	218	682	220
78	186	13	35	N	209	611	7	78	186	13	35	N	219	687	73	78	186	13	35	N	219	687	73	78	186	13	35	N	219	687	73
78	186	14	11	S	170	660	604	78	186	14	11	S	73	663	3	78	186	14	11	S	73	663	3	78	186	14	11	S	73	663	3
78	186	14	24	N	102	617	17	78	186	14	24	N	193	670	15	78	186	14	24	N	193	670	15	78	186	14	24	N	193	670	15
78	186	14	59	S	61	571	13	78	186	14	59	S	67	680	2	78	186	14	59	S	67	680	2	78	186	14	59	S	67	680	2
78	186	15	18	N	211	608	13	78	186	15	18	N	202	679	-1	78	186	15	18	N	202	679	-1	78	186	15	18	N	202	679	-1
78	186	15	55	S	164	651	573	78	186	15	55	S	76	696	8	78	186	15	55	S	76	696	8	78	186	15	55	S	76	696	8
78	186	16	6	S	109	609	558	78	186	16	6	S	196	679	-3	78	186	16	6	S	196	679	-3	78	186	16	6	S	196	679	-3
78	186	16	42	N	53	583	38	78	186	16	42	N	197	691	-38	78	186	16	42	N	197	691	-38	78	186	16	42	N	197	691	-38
78	186	17	0	N	60	545	12	78	186	17	0	N	72	697	72	78	186	17	0	N	72	697	72	78	186	17	0	N	72	697	72
78	186	17	21	S	214	606	24	78	186	17	21	S	76	696	3	78	186	17	21	S	76	696	3	78	186	17	21	S	76	696	3
78	186	18	26	N	61	568	59	78	186	18	26	N	201	686	21	78	186	18	26	N	201	686	21	78	186	18	26	N	201	686	21
78	186	18	42	S	217	592	13	78	186	18	42	S	189	682	1	78	186	18	42	S	189	682	1	78	186	18	42	S	189	682	1
78	186	19	33	N	109	625	581	78	186	19	33	N	81	682	0	78	186	19	33	N	81	682	0	78	186	19	33	N	81	682	0
78	186	20	8	S	64	575	21	78	186	20	8	S	72	665	10	78	186	20	8	S	72	665	10	78	186	20	8	S	72	665	10
78	186	20	25	N	219	591	18	78	186	20	25	N	206	663	2	78	186	20	25	N	206	663	2	78	186	20	25	N	206	663	2
78	186	21	51	S	65	604	9	78	186	21	51	S	178	691	-1	78	186	21	51	S	178	691	-1	78	186	21	51	S	178	691	-1

YR	DA	HDDK HR	MN	SEC	PO	HDDK LT	LAT	CODK LT	LAT	MIDNIGHT LAT	LAT	DA	YR
78	191	2	39	58	S	203	659	203	667	8	640	649	78
78	191	2	54	40	S	76	656	76	657	1	642	652	78
78	191	3	29	43	S	70	648	70	651	3	634	646	78
78	191	3	44	30	S	199	677	199	688	11	647	660	78
78	191	4	20	8	S	205	659	205	654	-5	640	637	78
78	191	4	34	52	S	70	653	70	659	6	639	654	78
78	191	5	10	35	N	72	642	72	652	10	637	647	78
78	191	5	25	7	N	194	661	194	674	13	635	648	78
78	191	6	0	1	S	203	657	204	664	7	637	646	78
78	191	6	14	40	S	68	657	58	647	-10	631	650	78
78	191	6	52	7	N	75	666	75	650	-16	633	645	78
78	191	7	4	58	N	194	674	194	687	13	634	659	78
78	191	7	40	30	S	200	674	200	675	1	636	656	78
78	191	7	54	0	S	59	674	70	649	-25	635	644	78
78	191	8	32	46	N	77	674	77	673	-1	632	669	78
78	191	8	46	0	N	198	658	198	661	3	636	636	78
78	191	9	20	49	S	194	672	194	671	-1	632	645	78
78	191	9	35	19	S	76	643	76	647	4	628	642	78
78	191	10	11	53	N	76	639	76	644	6	623	638	78
78	191	10	27	13	N	203	650	203	661	1	630	643	78
78	191	11	2	18	S	185	686	184	697	11	627	659	78
78	191	11	15	54	S	94	642	55	657	15	622	646	78
78	191	11	52	21	N	70	635	69	654	29	619	668	78
78	191	12	8	45	N	208	646	209	674	28	625	655	78
78	191	12	44	36	S	173	688	172	700	12	642	653	78
78	191	12	57	2	S	94	636	93	646	10	606	624	78
78	191	13	33	33	N	63	611	63	621	10	601	622	78
78	191	13	50	21	N	212	650	213	660	10	638	648	78
78	191	15	16	39	N	58	606	56	628	22	593	633	78
78	191	15	31	49	N	216	658	217	662	4	617	650	78
78	191	17	0	15	N	56	608	55	618	10	601	622	78
78	191	17	13	52	N	219	650	220	658	8	638	649	78
78	191	18	43	31	N	57	619	57	622	3	613	627	78
78	191	18	55	40	N	223	652	226	669	17	647	661	78
78	191	20	26	6	N	59	637	58	647	10	623	653	78
78	191	20	37	53	N	225	655	227	666	11	633	658	78
78	191	22	7	52	N	62	643	61	660	17	636	664	78
78	191	22	21	3	N	224	652	225	658	6	647	649	78
78	191	23	2	56	S	180	700	180	701	1	634	663	78
78	191	23	15	9	S	93	635	94	648	13	635	627	78
78	191	23	49	43	N	65	654	66	651	-3	637	654	78
78	191	0	3	47	N	222	672	221	669	-4	630	660	78
78	192	0	43	15	S	194	688	194	689	1	630	661	78
78	192	0	56	30	S	66	657	66	665	8	638	658	78
78	192	1	30	59	N	68	647	63	650	3	640	653	78
78	192	1	46	52	N	211	671	211	672	1	631	659	78
78	192	2	23	35	S	203	683	203	683	1	633	663	78
78	192	2	38	5	S	78	638	78	642	4	633	636	78
78	192	3	12	23	N	70	646	70	644	-2	631	638	78
78	192	3	28	0	N	200	656	200	674	18	636	655	78
78	192	4	3	12	S	205	663	203	672	9	642	653	78
78	192	4	18	0	S	71	649	71	655	6	635	650	78
78	192	4	53	54	N	71	357	72	645	-12	623	639	78
78	192	5	8	8	N	194	659	194	666	27	627	658	78

148

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	CDJK	LT	LAT	DLAT	MIDNIGHT	DLAT	LATH, LAT	MIDNIGHT	DLAT	LATH, LAT	CDJK	LT	LAT	DLAT	LATH, LAT	MIDNIGHT	DLAT	LATH, LAT
78 199	13 12 53	13	12	53	N	211	560	211	561	211	561	9	649	649	-9	680	679	-9	680	205	693	70	646	646	640	672	640
78 199	14 0 2	14	0	2	S	58	634	57	639	107	643	9	629	649	6	681	666	6	681	197	695	70	646	646	640	679	640
78 199	14 39 57	14	39	57	N	215	656	216	660	107	663	12	645	655	12	682	660	12	682	206	680	70	645	645	640	679	640
78 199	14 54 47	14	54	47	N	67	618	67	618	67	618	4	602	618	4	602	618	4	602	68	674	70	645	645	640	679	640
78 199	23 11 24	23	11	24	N	219	620	220	625	220	625	5	605	614	5	605	614	5	605	73	645	70	645	645	640	679	640
78 199	23 28 1	23	28	1	N	192	627	192	636	192	636	9	591	614	9	591	614	9	591	73	645	70	645	645	640	679	640
78 200	0 4 44	0	4	44	S	85	622	85	622	85	622	15	539	627	15	539	627	15	539	194	677	194	677	645	640	679	640
78 200	0 20 35	0	20	35	S	85	622	85	622	85	622	2	630	642	2	630	642	2	630	203	658	203	658	645	640	679	640
78 200	0 53 44	0	53	44	N	63	638	63	638	63	638	19	607	630	19	607	630	19	607	69	645	69	645	645	640	679	640
78 200	1 11 0	1	11	0	N	211	622	213	641	213	641	19	613	628	19	613	628	19	613	76	653	76	653	645	640	679	640
78 200	1 45 40	1	45	40	S	200	635	200	644	200	644	9	613	628	9	613	628	9	613	195	646	195	646	645	640	679	640
78 200	2 2 20	2	2	20	S	81	611	81	611	81	611	13	587	611	13	587	611	13	587	195	646	195	646	645	640	679	640
78 200	2 34 12	2	34	12	N	70	607	70	607	70	607	14	589	614	14	589	614	14	589	195	646	195	646	645	640	679	640
78 200	2 32 15	2	32	15	N	202	624	202	633	202	633	9	601	618	9	601	618	9	601	195	646	195	646	645	640	679	640
78 200	2 26 0	2	26	0	S	204	635	204	633	204	633	3	614	623	3	614	623	3	614	77	650	77	650	645	640	679	640
78 200	3 42 39	3	42	39	S	74	619	74	619	74	619	11	602	623	11	602	623	11	602	200	640	200	640	645	640	679	640
78 200	4 16 0	4	16	0	N	136	648	136	648	136	648	3	615	623	3	615	623	3	615	192	659	192	659	645	640	679	640
78 200	5 2 44	5	2	44	S	70	618	70	618	70	618	11	602	623	11	602	623	11	602	192	659	192	659	645	640	679	640
78 200	5 57 10	5	57	10	N	194	638	194	638	194	638	12	603	626	12	603	626	12	603	182	681	182	681	641	650	641	650
78 200	6 12 23	6	12	23	S	202	650	202	654	202	654	4	630	637	4	630	637	4	630	182	681	182	681	641	650	641	650
78 200	6 46 23	6	46	23	S	77	688	77	688	77	688	7	636	645	7	636	645	7	636	182	681	182	681	641	650	641	650
78 200	9 19 53	9	19	53	N	201	656	201	663	201	663	7	636	645	7	636	645	7	636	182	681	182	681	641	650	641	650
78 200	9 33 0	9	33	0	S	190	676	190	677	190	677	10	628	626	10	628	626	10	628	182	681	182	681	641	650	641	650
78 200	10 7 53	10	7	53	S	79	643	79	643	79	643	14	546	646	14	546	646	14	546	182	681	182	681	641	650	641	650
78 200	10 22 12	10	22	12	N	206	670	206	671	206	671	1	652	652	1	652	652	1	652	182	681	182	681	641	650	641	650
78 200	10 50 57	10	50	57	N	179	697	179	697	179	697	5	656	655	5	656	655	5	656	221	682	221	682	640	675	640	675
78 200	11 15 44	11	15	44	S	89	627	89	627	89	627	24	618	654	24	618	654	24	618	223	651	223	651	645	653	645	653
78 200	11 50 4	11	50	4	S	179	697	179	697	179	697	8	627	628	8	627	628	8	627	223	651	223	651	645	653	645	653
78 200	12 2 46	12	2	46	N	67	627	66	631	66	631	0	659	656	0	659	656	0	659	184	697	184	697	645	653	645	653
78 200	12 39 24	12	39	24	N	211	669	211	669	211	669	24	618	654	24	618	654	24	618	184	697	184	697	645	653	645	653
78 200	12 55 14	12	55	14	S	60	616	60	616	60	616	8	605	625	8	605	625	8	605	184	697	184	697	645	653	645	653
78 200	13 43 52	13	43	52	S	215	659	216	675	216	675	16	618	662	16	618	662	16	618	184	697	184	697	645	653	645	653
78 200	14 21 44	14	21	44	N	53	635	53	635	53	635	4	630	641	4	630	641	4	630	184	697	184	697	645	653	645	653
78 200	14 37 22	14	37	22	N	54	627	54	627	54	627	9	622	641	9	622	641	9	622	184	697	184	697	645	653	645	653
78 200	16 6 1	16	6	1	N	223	665	224	673	224	673	8	662	665	8	662	665	8	662	184	697	184	697	645	653	645	653
78 200	17 49 1	17	49	1	N	56	644	56	644	56	644	16	640	666	16	640	666	16	640	184	697	184	697	645	653	645	653
78 200	18 0 40	18	0	40	N	226	662	227	670	227	670	8	658	662	8	658	662	8	658	184	697	184	697	645	653	645	653
78 200	19 31 57	19	31	57	S	55	678	55	678	55	678	8	669	665	8	669	665	8	669	184	697	184	697	645	653	645	653
78 200	20 35 37	20	35	37	S	226	660	227	674	227	674	14	656	666	14	656	666	14	656	184	697	184	697	645	653	645	653
78 200	21 14 37	21	14	37	N	63	652	63	652	63	652	27	645	685	27	645	685	27	645	184	697	184	697	645	653	645	653
78 200	21 25 31	21	25	31	N	225	672	226	680	226	680	8	670	673	8	670	673	8	670	184	697	184	697	645	653	645	653
78 200	22 55 28	22	55	28	N	184	724	184	725	184	725	1	692	661	1	692	661	1	692	184	697	184	697	645	653	645	653
78 200	23 3 22	23	3	22	S	65	671	64	690	64	690	9	666	686	9	666	686	9	666	184	697	184	697	645	653	645	653
78 200	23 50 41	23	50	41	S	218	684	219	690	219	690	6	676	676	6	676	676	6	676	184	697	184	697	645	653	645	653
78 200	24 1 44	24	1	44	N	198	705	198	708	198	708	11	648	671	11	648	671	11	648	184	697	184	697	645	653	645	653
78 200	0 37 39	0	37	39	N	65	671	64	690	64	690	9	666	686	9	666	686	9	666	184	697	184	697	645	653	645	653
78 201	0 51 19	0	51	19	S	218	684	219	690	219	690	6	676	676	6	676	676	6	676	184	697	184	697	645	653	645	653
78 201	1 30 45	1	30	45	S	198	705	198	708	198	708	11	648	671	11	648	671	11	648	184	697	184	697	645	653	645	653
78 201	1 43 29	1	43	29	S	82	665	82	677	82	677	1	673	684	1	673	684	1	673	184	697	184	697	645	653	645	653
78 201	2 19 18	2	19	18	N	67	677	67	678	67	678	3	670	669	3	670	669	3	670	184	697	184	697	645	653	645	653
78 201	2 33 13	2	33	13	N	206	687	207	690	207	690	3	670	669	3	670	669	3	670	184	697	184	697	645	653	645	653

152

153

154

YR	DA	HR	MN	SEC	PO	HDDK	LT	LAT	COCK	DLAT	MIDNIGHT	LATH, LATH	COCK	LT	LAT	COCK	DLAT	MIDNIGHT	LATH, LATH
78 217	78 217	5 33	27	0	S	71	607	72 609	72 609	2	582	582	197	590	197	590	197	590	584
78 217	78 217	6 23	0	N	N	74	613	75 616	75 616	3	598	608	199	610	199	610	199	610	598
78 217	78 217	6 55	15	S	S	201	605	202 605	202 605	0	581	593	78	592	78	592	78	592	635
78 217	78 217	7 14	0	S	S	201	605	202 605	202 605	0	581	593	78	592	78	592	78	592	672
78 217	78 217	7 47	11	N	N	77	598	77 622	77 622	24	576	615	201	640	201	640	201	640	624
78 217	78 217	8 35	14	S	N	197	599	197 600	197 600	1	559	582	193	663	193	663	193	663	642
78 217	78 217	8 54	53	S	S	74	568	74 582	74 582	14	547	572	80	607	80	607	80	607	641
78 217	78 217	9 26	29	N	N	78	565	78 582	78 582	29	544	585	74	591	74	591	74	591	649
78 217	78 217	9 44	30	N	N	202	607	202 607	202 607	22	583	614	205	634	205	634	205	634	646
78 217	78 217	10 17	38	S	S	191	658	192 659	192 659	1	528	634	90	653	90	653	90	653	651
78 217	78 217	10 34	1	N	S	80	599	81 622	81 622	23	574	609	62	647	62	647	62	647	618
78 217	78 217	11 8	7	N	S	75	615	75 624	75 624	8	599	617	210	641	210	641	210	641	635
78 217	78 217	11 25	29	N	N	206	618	206 621	206 621	6	595	610	175	663	175	663	175	663	625
78 217	78 217	11 59	30	S	S	182	669	183 665	183 665	-4	627	629	100	643	100	643	100	643	602
78 217	78 217	12 14	45	S	S	88	598	89 618	89 618	20	573	604	63	638	63	638	63	638	648
78 217	78 217	12 47	58	N	N	69	576	69 583	69 583	7	562	590	222	636	222	636	222	636	632
78 217	78 217	13 7	20	N	N	209	614	210 612	210 612	3	530	612	182	699	182	699	182	699	663
78 217	78 217	13 42	5	S	S	173	563	173 667	173 667	4	602	613	93	665	93	665	93	665	652
78 217	78 217	13 56	19	S	S	97	589	100 624	100 624	35	548	580	195	682	195	682	195	682	655
78 217	78 217	14 30	46	N	N	62	578	61 607	61 607	29	565	606	84	683	84	683	84	683	655
78 217	78 217	14 49	5	N	N	212	617	212 621	212 621	4	601	611	67	671	67	671	67	671	679
78 217	78 217	16 13	43	N	N	60	564	58 593	58 593	29	549	595	207	654	207	654	207	654	654
78 217	78 217	16 31	1	N	N	213	610	215 625	215 625	15	593	615	69	684	69	684	69	684	649
78 217	78 217	17 57	40	N	N	59	583	58 597	58 597	15	585	607	199	654	199	654	199	654	636
78 217	78 217	18 13	1	N	N	216	602	218 617	218 617	15	585	607	206	662	206	662	206	662	644
78 217	78 217	19 40	28	N	N	61	594	60 611	60 611	21	582	615	73	697	73	697	73	697	667
78 217	78 217	19 55	25	N	N	218	593	219 603	219 603	10	575	594	195	686	195	686	195	686	641
78 217	78 217	21 21	44	N	N	65	580	64 604	64 604	24	567	603	205	695	205	695	205	695	679
78 217	78 217	21 37	59	N	N	219	598	220 613	220 613	15	580	601	67	696	67	696	67	696	642
78 217	78 217	22 19	0	S	S	174	608	175 683	175 683	-5	632	632	77	697	77	697	77	697	649
78 217	78 217	22 32	39	S	S	92	576	93 594	93 594	10	532	554	196	687	196	687	196	687	669
78 217	78 217	23 4	30	N	N	66	621	66 627	66 627	6	612	628	202	677	202	677	202	677	659
78 217	78 217	23 21	4	N	N	218	607	220 625	220 625	18	590	614	71	676	71	676	71	676	635
78 217	78 217	23 59	4	S	S	189	666	189 666	189 666	23	585	629	196	687	196	687	196	687	659
78 218	78 218	0 13	59	N	N	88	609	89 637	89 637	23	585	629	202	677	202	677	202	677	659
78 218	78 218	0 47	4	N	N	66	651	68 627	68 627	-24	644	628	78	668	78	668	78	668	643
78 218	78 218	1 31	31	N	N	212	628	213 630	213 630	2	613	619	155	668	155	668	155	668	654
78 218	78 218	1 39	19	S	S	189	653	189 653	189 653	0	620	629	77	654	77	654	77	654	650
78 218	78 218	1 53	59	S	S	81	655	81 635	81 635	-24	640	644	77	657	77	657	77	657	643
78 218	78 218	2 29	36	N	N	67	682	69 641	69 641	-41	578	643	205	657	205	657	205	657	648
78 218	78 218	2 45	0	N	N	203	631	204 649	204 649	1	609	632	187	681	187	681	187	681	645
78 218	78 218	3 19	24	S	S	204	645	204 646	204 646	1	624	630	88	675	88	675	88	675	645
78 218	78 218	3 36	5	S	S	75	610	71 623	71 623	32	572	616	210	662	210	662	210	662	646
78 218	78 218	4 7	59	N	N	72	591	72 591	72 591	17	572	606	210	662	210	662	210	662	646
78 218	78 218	4 25	59	N	N	197	510	197 510	197 510	23	564	616	174	693	174	693	174	693	649
78 218	78 218	4 58	18	S	S	204	508	205 631	205 631	23	584	616	100	678	100	678	100	678	627
78 218	78 218	5 16	57	S	S	72	592	72 603	72 603	11	573	626	63	639	63	639	63	639	605
78 218	78 218	5 50	22	N	N	74	633	74 633	74 633	11	573	626	213	644	213	644	213	644	718
78 218	78 218	6 5	48	N	N	195	621	195 621	195 621	23	564	616	113	670	113	670	113	670	594
78 218	78 218	6 37	38	S	S	201	587	202 585	202 585	-2	561	575	60	589	60	589	60	589	615
78 218	78 218	6 57	15	S	S	72	537	72 537	72 537	26	567	591	217	654	217	654	217	654	642
78 218	78 218	7 29	20	N	N	77	572	77 598	77 598	26	551	589	55	599	55	599	55	599	619

156

158

159

161

YR	DA	HR	MN	SEC	PO	HDDK	LT	LAT	COOK	DLAT	LATH	LATC	MIDNIGHT	DLAT	LATH	LATC
78	236	3	13	36	S	205	682	-1	656	662	2	655	656	2	655	656
78	236	3	27	17	S	74	665	1	652	676	6	653	668	6	653	668
78	236	4	3	25	N	71	679	1	666	676	14	662	686	14	662	686
78	236	4	17	2	N	199	674	2	644	650	5	640	649	5	640	649
78	236	4	53	24	N	207	670	-4	655	651	5	646	652	5	646	652
78	236	5	7	37	S	71	657	-24	642	672	11	677	697	11	677	697
78	236	5	45	0	N	75	659	-23	629	672	15	677	696	15	677	696
78	236	5	57	8	N	196	675	-23	629	672	15	677	696	15	677	696
78	236	6	35	7	S	206	668	12	630	660	16	645	660	16	645	660
78	236	6	46	46	S	79	695	1	643	633	15	641	652	15	641	652
78	236	7	25	29	N	196	672	18	642	662	14	636	660	14	636	660
78	236	7	37	30	N	202	684	8	638	654	3	636	641	3	636	641
78	236	8	13	23	S	74	667	-5	650	653	1	651	652	1	651	652
78	236	8	26	59	N	80	685	-22	633	620	26	615	636	26	615	636
78	236	9	5	11	N	202	662	15	643	656	2	649	653	2	649	653
78	236	9	18	27	N	195	693	-6	656	659	2	691	678	2	691	678
78	236	9	54	22	S	82	691	-21	676	663	14	618	645	14	618	645
78	236	10	6	39	S	76	665	5	652	662	6	617	634	6	617	634
78	236	10	45	14	N	209	659	10	640	653	10	637	647	10	637	647
78	236	10	59	36	N	184	702	-1	656	653	8	618	637	8	618	637
78	236	11	35	58	S	95	705	11	677	704	9	650	662	9	650	662
78	236	11	47	12	S	94	684	6	674	690	2	674	681	2	674	681
78	236	12	26	32	N	69	678	6	650	659	2	674	681	2	674	681
78	236	12	41	0	N	213	561	11	650	659	4	659	657	4	659	657
78	236	13	19	26	S	169	717	167	722	5	680	680	6	652	659	
78	236	13	28	2	S	107	691	-1	672	677	6	671	690	6	671	690
78	236	14	8	4	N	62	649	2	642	654	18	675	665	18	675	665
78	236	14	22	28	N	217	657	2	657	656	5	657	667	5	657	667
78	236	15	51	43	N	54	650	-1	648	656	3	668	668	3	668	668
78	236	16	4	10	N	220	668	13	645	674	-18	656	646	-18	656	646
78	236	16	4	10	N	53	645	7	641	656	-45	694	646	-45	694	646
78	236	17	34	52	N	52	683	-1	684	676	3	688	688	3	688	688
78	236	17	45	17	N	52	673	12	655	680	-1	659	657	-1	659	657
78	236	19	17	57	N	228	661	9	670	674	0	643	652	0	643	652
78	236	19	27	47	N	51	697	14	673	705	-6	668	671	-6	668	671
78	236	21	0	34	N	54	683	0	673	667	11	652	654	11	652	654
78	236	21	10	9	N	228	675	9	673	667	11	652	654	11	652	654
78	236	22	42	32	N	55	703	2	650	676	207	658	1549	207	658	1549
78	236	22	53	6	N	227	681	2	650	676	71	648	1544	71	648	1544
78	236	23	36	34	S	182	719	14	652	714	13	678	673	13	678	673
78	236	23	46	40	S	95	696	2	683	699	8	663	670	8	663	670
78	236	23	46	40	S	62	692	0	683	699	18	663	670	18	663	670
78	236	23	53	53	N	219	681	6	666	666	5	680	697	5	680	697
78	236	23	53	53	N	196	689	0	661	661	23	676	692	23	676	692
78	236	24	15	16	S	84	705	14	676	703	8	680	697	8	680	697
78	236	24	26	40	S	84	705	14	676	703	8	680	697	8	680	697
78	236	24	26	40	S	66	682	1	678	689	23	676	692	23	676	692
78	236	24	26	40	S	203	675	17	640	657	198	715	684	198	715	684
78	236	24	26	40	S	204	681	9	640	657	198	715	684	198	715	684
78	236	24	26	40	S	75	665	25	629	663	-31	663	638	-31	663	638
78	236	24	26	40	S	204	672	9	640	657	198	715	684	198	715	684
78	236	24	26	40	S	76	644	9	640	657	198	715	684	198	715	684
78	236	24	26	40	S	200	685	4	663	666	188	714	671	188	714	671
78	236	24	26	40	S	208	679	6	663	666	87	650	671	87	650	671
78	236	24	26	40	S	203	685	8	663	666	74	648	643	74	648	643
78	236	24	26	40	S	72	644	72	644	678	213	685	13	662	671	
78	236	24	26	40	S	197	625	-1	658	657	174	718	684	174	718	684

164

168

YR	DA	HDDK	HR	KN	SEC	PG	HDDK	LT	LAT	CODE	DLAT	MIDNIGHT	LATH	LATC
78	255	20 47	20	47	47	N	221	603	221	610	-5	590	592	670
78	255	22 15	22	15	48	N	224	635	224	638	-3	635	639	670
78	255	22 29	22	29	36	N	183	668	183	670	-2	626	633	670
78	255	23 10	23	10	24	S	95	652	94	632	-15	626	633	670
78	255	23 22	23	22	57	S	95	652	94	632	-15	626	633	670
78	255	23 57	23	57	27	N	66	649	68	624	-25	642	625	670
78	255	0 50	0	50	54	N	194	658	194	656	-2	626	632	670
78	255	1 30	1	30	30	S	85	600	85	617	-17	575	603	670
78	255	1 35	1	35	35	N	67	656	70	606	-50	590	597	670
78	255	2 30	2	30	52	N	208	641	202	643	-2	620	627	670
78	255	2 45	2	45	59	S	202	640	202	648	-2	619	631	670
78	255	3 15	3	15	57	N	71	635	78	632	-23	619	624	670
78	255	3 36	3	36	14	N	201	651	202	651	-10	619	624	670
78	255	4 11	4	11	19	S	207	649	208	661	12	629	643	670
78	255	4 27	4	27	20	S	75	621	75	633	-12	634	626	670
78	255	5 15	5	15	43	N	76	638	76	625	-12	623	618	670
78	255	5 51	5	51	30	S	209	656	199	677	2	645	650	670
78	255	6 43	6	43	1	N	73	657	74	641	-16	643	639	670
78	255	6 55	6	55	59	N	80	669	80	647	-22	651	637	670
78	255	7 31	7	31	35	S	206	660	206	668	-3	641	649	670
78	255	7 46	7	46	10	S	75	654	76	628	-25	640	621	670
78	255	8 23	8	23	38	N	82	674	82	656	-18	657	647	670
78	255	8 26	8	26	58	N	203	653	202	664	11	633	646	670
78	255	9 11	9	11	38	S	201	653	201	655	2	633	632	670
78	255	9 26	9	26	30	S	80	649	80	639	-10	629	628	670
78	255	10 18	10	18	12	N	208	642	209	728	86	621	704	670
78	255	10 52	10	52	44	S	194	660	194	666	6	628	641	670
78	255	11 6	11	6	44	S	89	656	90	684	28	637	776	670
78	255	13 26	13	26	0	N	66	671	69	644	-27	666	647	670
78	255	13 40	13	40	30	N	217	662	219	682	20	651	668	670
78	255	14 28	14	28	59	S	57	670	57	670	0	669	677	670
78	255	15 9	15	9	17	N	220	656	221	671	15	651	663	670
78	255	15 22	15	22	29	N	55	638	55	641	3	634	646	670
78	255	16 51	16	51	38	N	221	655	222	663	8	650	655	670
78	255	17 4	17	4	15	N	58	619	58	625	6	613	630	670
78	255	18 33	18	33	55	N	224	652	225	659	7	647	650	670
78	255	18 45	18	45	13	N	60	633	59	640	7	625	645	670
78	255	20 16	20	16	30	N	228	667	228	669	-2	652	661	670
78	255	21 58	21	58	59	N	61	658	62	652	-6	652	655	670
78	255	22 10	22	10	39	N	229	670	228	671	1	668	663	670
78	255	22 54	22	54	39	S	175	710	176	712	-2	676	667	670
78	255	23 3	23	3	56	S	101	699	96	646	-53	684	624	670
78	255	23 41	23	41	22	N	62	681	62	681	-2	681	671	670
78	255	23 53	23	53	50	N	191	690	191	689	-1	662	661	670
78	255	0 34	0	34	39	S	89	694	89	691	-3	679	687	670
78	255	0 46	0	46	26	N	64	685	64	687	2	681	683	670
78	255	1 22	1	22	59	N	212	665	212	666	1	655	653	670
78	255	1 37	1	37	21	N	201	649	201	651	2	629	634	670
78	255	2 13	2	13	59	S	79	693	79	670	-23	682	666	670
78	255	2 27	2	27	40	S	79	693	79	670	-23	682	666	670

YR	DA	HODK	HR	MIN	SEC	PO	HODK	LT	LAT	COCK	LT	LAT	OLAT	MIDNIGHT	LAT	LATC
78	258	8	51	57		S	78	652	78	661	78	661	-5	642	657	673
78	258	9	30	15		N	82	645	83	671	83	671	-2	680	664	666
78	258	9	42	37		N	206	679	206	681	206	681	4	654	655	656
78	258	10	18	49		S	196	683	196	687	196	687	-19	676	655	652
78	258	10	31	12		S	87	691	86	672	86	672	6	648	655	637
78	258	12	50	40		N	71	661	71	669	71	669	8	643	650	657
78	258	13	6	2		N	216	655	216	663	216	663	8	643	650	657
78	258	13	45	14		S	63	646	63	640	63	640	-6	639	642	658
78	258	14	32	57		N	220	668	222	682	222	682	14	643	675	650
78	258	14	47	16		N	51	679	55	650	55	650	-29	675	656	646
78	258	16	17	59		N	51	664	49	685	49	685	21	663	651	646
78	258	18	0	32		N	229	689	229	689	229	689	1	688	682	678
78	258	18	10	1		N	52	684	49	698	49	698	14	685	707	672
78	258	19	43	33		N	230	683	230	688	230	688	5	683	688	672
78	258	19	52	16		N	52	702	53	702	53	702	0	705	710	672
78	258	21	25	59		N	52	687	232	689	232	689	2	687	689	665
78	258	21	34	43		N	57	705	57	705	57	705	2	687	689	665
78	258	23	7	42		N	226	677	226	677	226	677	7	670	670	657
78	258	23	12	30		N	188	651	188	651	188	651	9	710	653	657
78	258	24	0	18		S	95	721	95	720	95	720	3	657	671	657
78	258	0	47	29		N	65	663	65	666	65	666	12	649	659	659
78	258	1	2	32		N	215	660	215	672	215	672	9	643	652	652
78	258	1	40	29		S	198	676	198	685	198	685	5	646	651	657
78	258	1	54	3		S	81	664	81	659	81	659	-7	643	646	657
78	258	2	23	29		N	68	653	69	643	69	643	0	671	668	657
78	258	2	43	32		S	206	687	207	689	207	689	2	671	668	657
78	258	3	21	13		S	206	682	206	688	206	688	-20	652	639	639
78	258	3	34	35		S	75	665	76	645	76	645	8	650	650	650
78	258	4	10	55		N	72	684	73	655	73	655	-29	673	650	650
78	258	4	24	39		N	200	688	200	689	200	689	1	650	650	650
78	258	4	59	59		S	209	646	209	684	209	684	8	625	637	637
78	258	5	14	35		S	73	636	73	651	73	651	-5	653	637	637
78	258	6	39	58		S	208	641	208	648	208	648	1	627	631	631
78	258	6	55	13		S	74	646	82	648	82	648	7	620	638	638
78	258	7	31	16		N	81	641	81	641	81	641	12	635	649	649
78	258	7	45	25		N	201	655	201	667	201	667	9	643	652	652
78	258	8	20	28		S	234	662	235	671	235	671	2	675	668	668
78	258	8	34	23		S	77	669	83	652	83	652	2	675	668	668
78	258	9	12	59		N	83	650	206	677	206	677	-1	657	658	658
78	258	9	25	30		N	205	675	199	679	199	679	-1	651	652	652
78	258	10	1	31		S	198	680	85	657	85	657	-18	658	648	648
78	258	10	14	33		S	85	675	85	657	85	657	-30	678	655	655
78	258	10	53	19		N	80	693	81	663	81	663	0	672	668	668
78	258	11	6	18		N	211	682	212	682	212	682	5	645	651	651
78	258	11	42	58		S	188	684	188	684	188	684	4	635	649	649
78	258	11	55	43		S	54	660	95	664	95	664	5	635	649	649
78	258	12	34	19		N	71	693	73	661	73	661	-32	682	667	667
78	258	12	48	31		N	215	659	217	683	217	683	24	648	669	669
78	258	13	25	25		S	178	680	178	681	178	681	1	629	630	630
78	258	13	35	1		S	112	700	113	703	113	703	3	676	671	671
78	258	14	15	57		N	63	664	62	673	62	673	9	658	678	678
78	258	14	30	15		N	219	659	222	682	222	682	23	648	675	675
78	258	16	0	27		N	51	683	50	690	50	690	7	684	698	698

VR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	DLAT	LATH, LATH	MIDNIGHT	CDDK	LT	LAT	DLAT	LATH, LATH	MIDNIGHT
78 283	78 283	11 38 0	11 38 0	11 38 0	11 38 0	N	190	682	215	702	9	686	215	702	9	686	215	702
78 283	78 283	12 16 29	12 16 29	12 16 29	12 16 29	S	181	720	181	723	3	688	181	723	3	688	181	723
78 283	78 283	12 26 3	12 26 3	12 26 3	12 26 3	S	103	704	103	702	-2	691	103	702	-2	691	103	702
78 283	78 283	13 6 9	13 6 9	13 6 9	13 6 9	N	69	680	69	679	-1	676	69	679	-1	676	69	679
78 283	78 283	13 19 59	13 19 59	13 19 59	13 19 59	N	219	677	221	701	24	668	221	701	24	668	221	701
78 283	78 283	14 48 39	14 48 39	14 48 39	14 48 39	N	60	664	61	651	-13	658	61	651	-13	658	61	651
78 283	78 283	15 2 4	15 2 4	15 2 4	15 2 4	N	221	668	225	693	25	665	225	693	25	665	225	693
78 283	78 283	16 32 27	16 32 27	16 32 27	16 32 27	N	49	688	49	689	1	693	49	689	1	693	49	689
78 283	78 283	15 44 1	15 44 1	15 44 1	15 44 1	N	222	664	227	683	25	661	227	683	25	661	227	683
78 283	78 283	18 15 27	18 15 27	18 15 27	18 15 27	N	48	685	46	689	23	683	46	689	23	683	46	689
78 283	78 283	18 26 12	18 26 12	18 26 12	18 26 12	N	224	653	227	676	23	648	227	676	23	648	227	676
78 283	78 283	19 58 24	19 58 24	19 58 24	19 58 24	N	52	684	53	683	-1	685	53	683	-1	685	53	683
78 283	78 283	20 8 30	20 8 30	20 8 30	20 8 30	N	225	649	226	653	-4	643	226	653	-4	643	226	653
78 283	78 283	21 38 59	21 38 59	21 38 59	21 38 59	N	61	656	62	650	-6	650	62	650	-6	650	62	650
78 283	78 283	21 52 8	21 52 8	21 52 8	21 52 8	N	223	626	224	626	0	616	224	626	0	616	223	626
78 283	78 283	22 53 44	22 53 44	22 53 44	22 53 44	S	178	678	177	687	9	626	177	687	9	626	178	678
78 283	78 283	22 45 0	22 45 0	22 45 0	22 45 0	S	99	659	101	677	18	634	101	677	18	634	99	659
78 283	78 283	23 19 56	23 19 56	23 19 56	23 19 56	N	66	641	66	641		653	66	641		653	66	641
78 283	78 283	23 34 15	23 34 15	23 34 15	23 34 15	N	224	660	224	660		653	224	660		653	224	660
78 283	78 283	0 14 40	0 14 40	0 14 40	0 14 40	S	190	682	190	683	1	653	190	683	1	653	190	682
78 283	78 283	0 28 0	0 28 0	0 28 0	0 28 0	S	39	639	39	635	-4	618	39	635	-4	618	39	639
78 283	78 283	1 2 39	1 2 39	1 2 39	1 2 39	N	65	674	65	668	-6	669	65	668	-6	669	65	674
78 283	78 283	1 16 55	1 16 55	1 16 55	1 16 55	N	215	675	215	679	3	667	215	679	3	667	215	675
78 283	78 283	2 9 1	2 9 1	2 9 1	2 9 1	S	80	657	80	657	14	634	80	657	14	634	80	657
78 283	78 283	2 43 44	2 43 44	2 43 44	2 43 44	S	68	655	68	659	4	659	68	659	4	659	68	655
78 283	78 283	2 58 47	2 58 47	2 58 47	2 58 47	N	205	670	205	672	2	652	205	672	2	652	205	670
78 283	78 283	3 34 58	3 34 58	3 34 58	3 34 58	S	206	662	206	663	1	643	206	663	1	643	206	662
78 283	78 283	3 48 54	3 48 54	3 48 54	3 48 54	S	75	673	75	677	4	661	75	677	4	661	75	673
78 283	78 283	4 24 37	4 24 37	4 24 37	4 24 37	N	74	653	74	656	3	639	74	656	3	639	74	653
78 283	78 283	4 40 1	4 40 1	4 40 1	4 40 1	N	200	642	200	639	-3	621	200	639	-3	621	200	642
78 283	78 283	5 13 59	5 13 59	5 13 59	5 13 59	S	209	628	209	627	-1	606	209	627	-1	606	209	628
78 283	78 283	5 30 40	5 30 40	5 30 40	5 30 40	S	76	621	76	621	0	604	76	621	0	604	76	621
78 283	78 283	6 4 30	6 4 30	6 4 30	6 4 30	N	79	615	80	632	17	598	80	632	17	598	79	615
78 283	78 283	6 20 43	6 20 43	6 20 43	6 20 43	N	200	621	200	620	9	598	200	620	9	598	200	621
78 283	78 283	6 54 0	6 54 0	6 54 0	6 54 0	S	208	629	208	635	6	607	208	635	6	607	208	629
78 283	78 283	7 10 34	7 10 34	7 10 34	7 10 34	S	76	624	76	624		608	76	624		608	76	624
78 283	78 283	7 44 38	7 44 38	7 44 38	7 44 38	N	82	597	83	623	26	572	83	623	26	572	82	597
78 283	78 283	7 59 53	7 59 53	7 59 53	7 59 53	N	202	661	202	661	0	642	202	661	0	642	202	661
78 283	78 283	8 34 22	8 34 22	8 34 22	8 34 22	S	204	637	204	638	31	616	204	638	31	616	204	637
78 283	78 283	8 49 59	8 49 59	8 49 59	8 49 59	S	79	640	79	640	8	625	79	640	8	625	79	640
78 283	78 283	9 26 40	9 26 40	9 26 40	9 26 40	N	93	559	93	559	-3	640	93	559	-3	640	93	559
78 283	78 283	9 40 55	9 40 55	9 40 55	9 40 55	N	207	650	207	651	21	630	207	651	21	630	207	650
78 283	78 283	10 16 6	10 16 6	10 16 6	10 16 6	S	197	677	197	677	0	617	197	677	0	617	197	677
78 283	78 283	10 28 59	10 28 59	10 28 59	10 28 59	S	87	680	86	637	-43	664	86	637	-43	664	87	680
78 283	78 283	11 7 20	11 7 20	11 7 20	11 7 20	N	80	673	80	672	-1	656	80	672	-1	656	80	673
78 283	78 283	11 22 0	11 22 0	11 22 0	11 22 0	N	212	653	213	664	11	641	213	664	11	641	212	653
78 283	78 283	11 57 41	11 57 41	11 57 41	11 57 41	S	198	680	188	682	2	640	188	682	2	640	198	680
78 283	78 283	12 9 41	12 9 41	12 9 41	12 9 41	S	98	579	98	680	-1	658	98	680	-1	658	98	579
78 283	78 283	12 48 59	12 48 59	12 48 59	12 48 59	N	70	688	71	677	-11	677	71	677	-11	677	70	688
78 283	78 283	13 41 14	13 41 14	13 41 14	13 41 14	S	217	668	217	668	0	658	217	668	0	658	217	668
78 283	78 283	13 50 49	13 50 49	13 50 49	13 50 49	S	173	698	181	650	-48	657	181	650	-48	657	173	698
78 283	78 283	14 31 3	14 31 3	14 31 3	14 31 3	N	62	667	61	675	3	661	61	675	3	661	62	667

173

YR	DA	HR	MM	SEC	FO	HDDK	LT	LAT	COO	LT	LAT	DLAT	MIDNIGHT LAT, L, L, C	YR	DA	HR	MM	SEC	FO	HDDK	LT	LAT	COO	LT	LAT	DLAT	MIDNIGHT LAT, L, L, C
78	273	22	9	29	N	59	681	87	619	62	631	619	634	78	273	22	9	29	N	59	681	87	619	62	631	619	634
78	273	22	21	25	N	225	641	87	619	62	631	619	634	78	273	22	21	25	N	225	641	87	619	62	631	619	634
78	273	23	4	33	S	176	721	103	709	0	699	705	694	78	273	23	4	33	S	176	721	103	709	0	699	705	694
78	273	23	13	7	N	103	709	72	565	57	626	533	623	78	273	23	13	7	N	103	709	72	565	57	626	533	623
78	273	23	50	13	N	65	662	193	661	15	620	530	620	78	273	23	50	13	N	65	662	193	661	15	620	530	620
78	274	0	43	15	S	193	661	86	641	0	620	530	620	78	274	0	43	15	S	193	661	86	641	0	620	530	620
78	274	0	57	26	S	86	641	86	641	0	620	530	620	78	274	0	57	26	S	86	641	86	641	0	620	530	620
78	274	1	31	25	N	57	654	89	602	0	620	530	620	78	274	1	31	25	N	57	654	89	602	0	620	530	620
78	274	1	44	30	N	218	736	214	701	0	620	530	620	78	274	1	44	30	N	218	736	214	701	0	620	530	620
78	274	2	23	17	S	201	844	201	664	0	620	530	620	78	274	2	23	17	S	201	844	201	664	0	620	530	620
78	274	2	37	49	S	78	667	79	589	0	620	530	620	78	274	2	37	49	S	78	667	79	589	0	620	530	620
78	274	3	12	46	N	71	651	71	651	0	620	530	620	78	274	3	12	46	N	71	651	71	651	0	620	530	620
78	274	3	26	51	N	203	646	203	646	0	620	530	620	78	274	3	26	51	N	203	646	203	646	0	620	530	620
78	274	4	3	11	N	208	633	208	633	0	620	530	620	78	274	4	3	11	N	208	633	208	633	0	620	530	620
78	274	4	18	57	S	77	652	77	652	0	620	530	620	78	274	4	18	57	S	77	652	77	652	0	620	530	620
78	274	4	54	0	N	201	667	201	667	0	620	530	620	78	274	4	54	0	N	201	667	201	667	0	620	530	620
78	274	5	8	25	N	211	640	211	640	0	620	530	620	78	274	5	8	25	N	211	640	211	640	0	620	530	620
78	274	5	43	23	S	211	640	211	640	0	620	530	620	78	274	5	43	23	S	211	640	211	640	0	620	530	620
78	274	5	58	8	S	75	654	75	654	0	620	530	620	78	274	5	58	8	S	75	654	75	654	0	620	530	620
78	274	6	35	1	N	82	657	82	657	0	620	530	620	78	274	6	35	1	N	82	657	82	657	0	620	530	620
78	274	6	49	23	N	202	636	202	636	0	620	530	620	78	274	6	49	23	N	202	636	202	636	0	620	530	620
78	274	7	22	53	S	208	625	208	625	0	620	530	620	78	274	7	22	53	S	208	625	208	625	0	620	530	620
78	274	7	36	29	S	77	653	77	653	0	620	530	620	78	274	7	36	29	S	77	653	77	653	0	620	530	620
78	274	8	15	39	N	84	661	84	661	0	620	530	620	78	274	8	15	39	N	84	661	84	661	0	620	530	620
78	274	8	28	56	N	204	670	204	670	0	620	530	620	78	274	8	28	56	N	204	670	204	670	0	620	530	620
78	274	9	3	0	S	204	617	204	617	0	620	530	620	78	274	9	3	0	S	204	617	204	617	0	620	530	620
78	274	9	17	59	S	62	670	62	670	0	620	530	620	78	274	9	17	59	S	62	670	62	670	0	620	530	620
78	274	9	56	0	N	84	666	84	666	0	620	530	620	78	274	9	56	0	N	84	666	84	666	0	620	530	620
78	274	10	11	19	N	209	618	209	618	0	620	530	620	78	274	10	11	19	N	209	618	209	618	0	620	530	620
78	274	10	43	28	S	198	605	198	605	0	620	530	620	78	274	10	43	28	S	198	605	198	605	0	620	530	620
78	274	10	59	9	S	90	650	90	650	0	620	530	620	78	274	10	59	9	S	90	650	90	650	0	620	530	620
78	274	11	35	59	N	80	654	80	654	0	620	530	620	78	274	11	35	59	N	80	654	80	654	0	620	530	620
78	274	11	53	0	N	213	609	213	609	0	620	530	620	78	274	11	53	0	N	213	609	213	609	0	620	530	620
78	274	12	26	28	S	189	633	189	633	0	620	530	620	78	274	12	26	28	S	189	633	189	633	0	620	530	620
78	274	12	40	58	S	98	620	98	620	0	620	530	620	78	274	12	40	58	S	98	620	98	620	0	620	530	620
78	274	13	16	39	N	72	629	72	629	0	620	530	620	78	274	13	16	39	N	72	629	72	629	0	620	530	620
78	274	13	34	38	N	216	613	216	613	0	620	530	620	78	274	13	34	38	N	216	613	216	613	0	620	530	620
78	274	14	5	1	S	181	645	176	645	0	620	530	620	78	274	14	5	1	S	181	645	176	645	0	620	530	620
78	274	14	22	30	N	107	612	107	612	0	620	530	620	78	274	14	22	30	N	107	612	107	612	0	620	530	620
78	274	14	59	30	N	217	615	217	615	0	620	530	620	78	274	14	59	30	N	217	615	217	615	0	620	530	620
78	274	15	16	22	N	57	640	57	640	0	620	530	620	78	274	15	16	22	N	57	640	57	640	0	620	530	620
78	274	18	26	48	N	221	616	221	616	0	620	530	620	78	274	18	26	48	N	221	616	221	616	0	620	530	620
78	274	20	8	18	N	62	621	62	621	0	620	530	620	78	274	20	8	18	N	62	621	62	621	0	620	530	620
78	274	20	22	15	N	222	639	222	639	0	620	530	620	78	274	20	22	15	N	222	639	222	639	0	620	530	620
78	274	21	49	18	N	68	602	68	602	0	620	530	620	78	274	21	49	18	N	68	602	68	602	0	620	530	620
78	274	22	4	38	N	224	622	224	622	0	620	530	620	78	274	22	4	38	N	224	622	224	622	0	620	530	620
78	274	22	45	36	S	180	675	180	675	0	620	530	620	78	274	22	45	36	S	180	675	180	675	0	620	530	620
78	274	22	56	59	S	99	665	100	670	0	620	530	620	78	274	22	56	59	S	99	665	100	670	0	620	530	620
78	274	23	31	0	N	89	610	89	610	0	620	530	620	78	274	23	31	0	N	89	610	89	610	0	620	530	620
78	275	0	27	0	S	190	693	190	693	0	620	530	620	78	275	0	27	0	S	190	693	190	693	0	620	530	620
78	275	0	39	36	S	88	656	88	656	0	620	530	620	78	275	0	39	36	S	88	656	88	656	0	620	530	620
78	275	1	12	2	N	70	597	70	597	0	620	530	620	78	275	1	12	2	N	70	597	70	597	0	620	530	620
78	275	2	7	41	S	200	695	200	695	0	620	530	620	78	275	2	7	41	S	200	695	200	695	0	620	530	620

177

YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	COOK	DLAT	MIDNIGHT	DLAT	MIDNIGHT	DLAT	MIDNIGHT
											LATH, LATH		LATH, LATH		LATH, LATH
78	284	0	2	1	N	56	554	66	650	-4	617	666	659	1	642
78	285	0	55	48	S	193	684	192	651	7	635	662	644	10	642
78	285	1	44	22	N	85	675	85	675	-11	610	661	640	12	642
78	285	2	36	0	S	202	673	202	681	-25	610	661	640	5	642
78	285	2	50	4	S	78	654	78	652	-2	640	647	640	1	636
78	285	3	24	36	N	72	644	72	647	3	629	642	640	7	614
78	285	3	39	38	N	204	685	204	685	-1	609	665	650	11	629
78	285	4	16	3	S	210	668	210	668	-16	658	655	640	6	639
78	285	4	29	46	S	76	671	77	655	-16	658	655	640	4	646
78	285	5	55	53	S	213	663	213	663	-4	652	654	630	11	620
78	285	6	9	57	S	76	663	77	654	-9	650	649	630	-3	645
78	285	6	48	0	N	84	691	84	688	-5	676	681	655	9	622
78	285	7	0	3	N	203	665	211	675	4	661	662	655	19	637
78	285	7	36	5	S	210	671	210	671	4	661	662	655	189	679
78	285	7	49	37	S	78	670	78	666	-4	657	662	650	103	674
78	285	8	28	2	N	86	675	96	678	2	659	672	650	73	650
78	285	8	40	34	N	206	682	206	684	1	666	664	650	220	662
78	285	9	16	43	S	205	685	205	681	-4	668	661	650	174	693
78	285	9	30	0	S	84	685	84	684	-1	668	661	650	62	662
78	285	10	9	5	N	85	704	85	679	-25	690	673	650	223	667
78	285	10	21	54	N	211	667	212	669	2	657	656	650	56	657
78	285	10	57	14	S	197	674	197	674	3	641	648	650	225	666
78	285	11	5	0	S	95	710	92	676	-34	696	685	650	54	666
78	285	11	48	59	N	79	685	79	693	7	675	691	650	226	660
78	285	12	4	17	S	216	633	216	633	0	619	622	650	62	631
78	285	12	38	50	S	188	663	188	663	0	619	622	650	227	649
78	285	12	50	2	S	108	699	108	699	0	619	622	650	228	652
78	285	13	28	57	N	72	634	73	623	-11	618	616	650	67	616
78	285	13	46	28	N	218	621	218	625	4	606	615	650	226	638
78	285	14	21	32	S	179	654	181	642	-12	588	607	650	179	684
78	285	15	12	6	N	64	633	64	633	0	625	635	650	98	632
78	285	15	29	31	N	216	585	216	591	5	567	582	650	69	614
78	285	18	38	58	N	58	639	61	616	-23	635	616	650	89	661
78	285	18	50	40	N	226	651	226	652	1	645	643	650	66	660
78	285	20	21	25	N	60	650	59	659	9	643	645	650	214	671
78	285	20	33	28	N	226	636	227	641	5	628	631	650	139	667
78	285	22	2	35	N	66	637	69	598	-39	629	597	650	80	663
78	285	22	16	34	N	225	631	226	639	8	622	629	650	69	664
78	285	22	58	11	S	130	694	179	700	6	657	652	650	204	659
78	285	23	9	0	S	99	667	97	643	-24	644	620	650	207	650
78	285	23	43	29	N	69	622	68	631	9	613	622	650	77	654
78	286	0	37	44	S	193	656	193	660	4	624	635	650	76	652
78	286	0	52	26	S	67	626	87	651	25	604	642	650	202	666
78	286	1	26	12	N	67	655	68	643	-12	649	646	650	212	651
78	286	2	18	8	S	201	650	201	650	9	519	638	650	82	643
78	286	3	16	53	N	71	635	71	644	9	519	638	650	203	676
78	286	3	23	13	S	204	660	204	664	4	641	646	650	82	646
78	286	3	58	34	S	209	656	209	653	-3	636	656	650	203	676
78	286	4	13	37	S	77	641	77	644	3	626	638	650	78	654
78	286	4	48	33	N	78	646	78	652	6	631	647	650	85	661
78	286	5	3	9	N	202	672	202	650	-22	654	653	650	205	664
78	286	5	33	28	S	212	653	213	664	11	641	651	650	207	658
78	286	5	53	39	S	77	641	77	641	626			650	81	662

YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	CDCK	DLAT	LATH, LATH	MIDNIGHT	YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	CDCK	DLAT	LATH, LATH	MIDNIGHT
78	292	3	3	11	N	72	608	71	619	11	590	611	78	293	5	32	54	S	77	662	79	632	-30	649	625
78	292	3	21	16	N	203	630	203	634	4	608	619	78	293	6	10	30	N	83	684	83	676	-8	668	670
78	292	2	54	47	S	208	626	208	631	5	604	616	78	293	6	23	23	N	203	669	203	665	16	651	665
78	292	4	10	59	S	78	634	78	631	5	618	619	78	293	6	58	52	S	213	669	213	670	1	659	657
78	292	4	45	25	N	78	636	78	626	-10	621	619	78	293	7	13	34	S	79	642	86	655	-8	645	646
78	292	5	1	48	N	203	621	203	625	4	588	611	78	293	7	50	26	N	86	663	206	631	-34	646	616
78	292	5	34	15	S	78	647	212	619	11	591	609	78	293	8	3	48	N	208	677	208	671	-6	659	652
78	292	5	50	34	S	78	647	212	619	11	591	609	78	293	8	3	48	N	208	677	208	671	-6	659	652
78	292	6	25	30	N	83	606	204	620	11	592	603	78	293	8	39	12	S	82	679	82	647	-32	663	637
78	292	6	42	0	N	204	618	204	620	2	595	606	78	293	9	31	8	N	87	676	87	660	-16	659	652
78	292	7	13	44	S	210	589	75	705	122	570	592	78	293	9	44	26	N	210	652	210	670	8	651	657
78	292	7	32	54	S	80	586	75	705	122	570	592	78	293	10	19	49	S	201	677	201	673	-4	659	654
78	292	8	5	30	N	86	586	206	615	32	570	604	78	293	10	32	25	S	90	681	91	680	-1	661	670
78	292	8	23	53	N	206	585	206	574	9	571	585	78	293	11	17	58	N	83	695	84	672	-23	680	665
78	292	8	53	31	S	206	572	206	572	0	574	585	78	293	11	23	18	N	215	644	215	644	5	631	637
78	292	9	12	24	S	83	597	93	620	23	572	607	78	293	12	0	52	S	193	664	192	673	9	633	647
78	292	9	47	23	N	87	645	211	613	13	585	581	78	293	12	13	31	S	101	674	68	635	-24	642	626
78	292	10	4	11	N	210	585	211	590	5	566	581	78	293	14	34	18	N	66	649	221	644	7	629	634
78	292	10	36	10	S	200	642	201	613	-29	621	600	78	293	14	49	33	N	220	637	221	632	-22	651	634
78	292	10	50	55	S	91	648	90	623	-25	623	593	78	293	16	18	10	N	58	654	61	632	-22	651	634
78	292	11	26	43	N	84	616	24	604	-12	613	583	78	293	18	0	20	N	60	625	58	639	14	616	644
78	292	11	15	18	N	215	594	215	619	24	576	608	78	293	18	14	32	N	220	605	221	612	7	592	600
78	292	12	17	28	S	193	635	193	644	2	600	621	78	293	19	41	57	N	64	601	63	618	17	590	618
78	292	12	30	40	S	103	677	104	685	8	652	670	78	293	19	56	33	N	223	606	224	618	12	593	606
78	292	13	7	25	N	77	600	76	607	7	592	599	78	293	21	25	33	N	226	654	68	606	-48	647	605
78	292	13	25	27	N	219	640	627	607	7	592	599	78	293	21	38	28	N	226	654	68	606	-48	647	605
78	292	14	1	9	S	181	663	178	677	14	620	625	78	293	23	7	52	N	63	676	65	662	-14	671	666
78	292	14	52	27	N	63	650	58	608	-52	654	597	78	293	23	20	6	N	237	670	238	678	8	668	671
78	292	15	8	57	N	217	594	218	604	10	576	595	78	293	23	20	6	N	237	670	238	678	8	668	671
78	292	16	35	51	N	57	652	62	613	-39	649	613	78	294	0	13	12	S	93	673	91	647	-26	651	626
78	292	16	50	36	N	218	594	219	612	18	576	592	78	294	0	49	31	N	64	680	66	655	-25	676	659
78	292	18	18	22	N	58	636	60	625	-11	632	626	78	294	1	3	19	N	217	675	218	680	4	667	657
78	292	18	30	46	N	224	639	224	634	-5	631	623	78	294	1	41	41	S	197	680	197	681	1	651	654
78	292	20	0	53	N	61	643	24	606	-37	636	605	78	294	2	31	31	S	82	672	82	672	0	655	665
78	292	20	14	16	N	223	600	224	613	13	555	601	78	294	2	31	31	N	66	686	68	671	-25	693	676
78	292	21	41	10	N	68	602	69	597	-5	591	595	78	294	2	45	46	N	208	662	206	666	4	643	648
78	292	21	57	15	N	223	595	223	600	5	590	597	78	294	3	21	15	S	206	653	206	663	10	633	645
78	292	22	37	25	S	179	678	179	678	0	626	626	78	294	3	35	44	S	77	663	78	653	-20	650	637
78	292	22	48	13	S	192	672	192	666	-6	644	642	78	294	4	11	55	N	75	672	75	677	5	660	674
78	292	23	22	41	N	70	606	70	615	7	588	605	78	294	4	26	36	N	203	652	203	656	4	632	639
78	292	23	39	0	N	223	541	223	648	10	638	538	78	294	5	1	3	S	212	644	212	648	4	631	636
78	293	0	17	56	S	191	569	190	579	-40	638	552	78	294	5	15	13	S	78	650	78	650	0	636	645
78	293	0	30	31	S	91	579	93	539	-40	638	552	78	294	5	52	29	N	82	659	82	587	-71	639	659
78	293	1	6	10	N	56	561	58	639	-23	655	640	78	294	6	6	21	N	202	663	203	664	1	644	648
78	293	1	21	32	N	214	659	214	664	5	648	651	78	294	6	40	51	S	212	638	213	658	20	625	646
78	293	1	58	11	N	199	656	199	663	7	624	538	78	294	6	56	28	N	79	642	79	642	-25	633	620
78	293	2	12	46	S	81	650	81	650	-1	632	641	78	294	7	23	6	N	86	657	86	632	-25	633	620
78	293	2	47	28	N	69	657	69	654	-3	651	650	78	294	7	46	19	S	205	675	205	684	9	657	664
78	293	3	3	58	N	204	633	204	637	4	611	621	78	294	8	21	52	N	209	672	209	670	-2	654	651
78	293	3	37	41	S	207	628	207	628	0	606	613	78	294	8	35	44	S	81	661	81	661	-10	659	659
78	293	3	53	1	N	77	659	76	606	-5	645	597	78	294	9	13	59	N	27	676	87	666	-10	659	659
78	293	4	29	4	N	76	667	77	657	-	654	652	78	294	9	27	15	S	209	665	210	664	-1	646	651
78	293	4	43	43	S	203	653	203	643	-10	633	627	78	294	10	2	6	S	203	662	203	663	1	643	645
78	293	5	17	59	S	212	637	212	641	4	623	630	78	294	10	15	25	S	89	675	89	682	3	663	677

YR DA		HDDK		HDDK		CDDK		MIDNIGHT		MIDNIGHT		CDDK		HDDK		HDDK		CDDK		MIDNIGHT		MIDNIGHT	
YR	DA	HR	MIN	SEC	PO	LT	LAT	LT	LAT	DLAT	LATH, LATH	DLAT	LATH, LATH	LT	LAT	LT	LAT	DLAT	LATH, LATH	LT	LAT	DLAT	LATH, LATH
8	294	10	53	23	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	11	9	25	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	11	43	13	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	11	56	18	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	12	34	11	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	12	51	0	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	13	25	49	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	13	37	51	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	14	16	50	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	14	33	3	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	15	59	17	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	16	13	42	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	22	47	19	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	23	3	55	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	23	43	0	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	294	23	57	47	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	0	28	0	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	0	46	34	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	1	24	4	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	1	39	36	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	2	12	7	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	2	28	22	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	3	4	3	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	3	4	45	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	5	49	52	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	6	22	35	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	6	39	30	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	7	15	47	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	7	31	16	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	8	2	59	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	8	18	59	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	8	56	9	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	9	11	31	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	9	43	29	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	10	1	0	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	10	35	36	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	10	52	36	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	11	25	52	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	11	39	45	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	12	15	54	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	12	32	55	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	13	8	37	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	13	20	53	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	13	59	21	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	14	14	8	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	15	5	33	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	15	41	0	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	15	57	0	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	0	14	22	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	0	27	56	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	1	7	53	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	1	20	11	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	1	56	19	S	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630
8	295	2	10	23	N	85	650	85	650	13	630	85	650	85	650	85	650	13	630	85	650	13	630

185

YR	DA	HDDK	HR	MN	SEC	PO	HDDK	LT	LAT	DLAT	MIDNIGHT	DLAT	LAT	DLAT	LATH, LATHC	MIDNIGHT
78	302	183	6	19	0	S	183	677	636	0	636	28	560	28	560	600
78	302	96	20	0	S	96	638	614	38	562	614	14	597	14	597	623
78	302	69	23	24	S	69	619	619	31	611	631	1	617	1	617	631
78	302	222	0	8	N	222	656	-2	656	-2	656	2	596	2	596	607
78	303	193	0	46	S	193	671	641	54	641	597	-128	608	-128	608	626
78	303	201	1	30	S	201	674	1	665	662	662	-5	608	-5	608	611
78	303	201	2	26	S	201	622	3	595	611	611	-2	600	-2	600	607
78	303	79	2	41	S	79	660	1	647	657	657	4	592	4	592	606
78	303	72	3	15	S	72	621	72	616	-5	614	5	595	5	595	609
78	303	204	3	32	N	204	663	0	624	629	629	212	605	212	605	599
78	303	209	4	7	S	209	648	210	645	-13	632	79	648	79	648	634
78	303	78	4	22	N	78	647	79	634	-22	612	84	660	84	660	641
78	303	79	4	56	N	79	628	204	644	0	623	204	634	204	634	619
78	303	213	5	12	N	213	644	213	623	0	607	212	616	212	616	606
78	303	80	5	45	S	80	614	77	636	72	551	80	623	80	623	617
78	303	84	6	37	S	84	604	-5	579	583	583	-39	655	-39	655	617
78	303	205	6	53	N	205	635	205	634	-1	613	87	658	87	658	653
78	303	211	7	25	S	211	595	211	608	13	577	207	637	207	637	631
78	303	81	7	43	S	81	595	81	615	16	574	212	631	212	631	627
78	303	87	8	17	N	87	603	87	602	16	574	202	623	202	623	628
78	303	208	8	34	N	208	609	208	609	-1	578	86	614	86	614	649
78	303	207	9	5	S	207	585	207	600	15	559	216	617	216	617	600
78	303	34	9	24	S	34	581	94	613	32	554	193	658	193	658	634
78	303	212	10	15	S	212	571	212	592	11	554	16	601	16	601	622
78	303	202	10	45	S	202	571	202	572	1	543	100	635	100	635	596
78	302	90	11	5	S	90	578	92	610	-0	535	76	645	76	645	539
78	303	85	11	37	N	85	578	85	590	6	587	219	621	219	621	611
78	303	215	11	57	N	215	578	215	578	9	558	187	627	187	627	553
78	303	197	12	27	S	197	559	197	568	9	514	17	548	17	548	535
78	303	79	12	46	S	79	593	22	526	553	553	5	582	5	582	596
78	303	79	13	17	N	79	593	22	526	553	553	2	582	2	582	597
78	303	217	13	29	N	217	580	217	590	-3	520	119	633	119	633	538
78	303	190	13	39	S	190	592	187	590	28	540	219	598	219	598	559
78	303	114	14	9	S	114	592	114	657	59	521	62	610	62	610	610
78	303	72	14	26	S	72	548	72	546	-2	525	221	608	221	608	555
78	303	216	15	21	N	216	508	217	574	6	547	226	632	226	632	630
78	303	188	15	51	S	188	519	188	550	1	484	226	632	226	632	621
78	303	67	16	6	S	67	554	67	554	-5	505	68	612	68	612	607
78	303	215	16	43	N	215	544	216	559	15	520	178	634	178	634	634
78	303	215	17	2	N	215	544	216	559	15	520	178	634	178	634	634
78	303	66	18	27	N	66	554	66	557	3	533	101	652	101	652	621
78	303	219	18	45	N	219	566	219	566	6	536	70	608	70	608	600
78	303	169	19	22	S	169	626	169	626	11	526	223	634	223	634	623
78	303	68	19	54	S	68	632	68	632	5	542	190	660	190	660	635
78	303	221	20	9	N	221	569	221	575	6	550	90	644	90	644	622
78	303	221	20	47	N	221	569	221	575	6	550	68	636	68	636	638
78	303	72	21	51	N	72	566	72	566	4	559	214	651	214	651	641
78	303	222	22	9	N	222	576	223	593	17	558	158	644	158	644	621
78	303	185	22	47	S	185	629	185	629	0	579	81	650	81	650	633
78	303	94	23	2	S	94	578	94	570	-8	563	70	618	70	618	616
78	303	71	23	33	N	71	593	71	593	10	563	206	631	206	631	606
78	303	420	23	51	N	420	616	420	616	6	584	75	726	75	726	726
78	304	193	0	27	S	193	621	193	629	8	584	75	726	75	726	726

										MIDNIGHT			MIDNIGHT		
										DLAT	LATH, LATH	DLAT	LATH, LATH	DLAT	LATH, LATH
										LT	LAT	LT	LAT	LT	LAT
										CDOK	LT	LAT	CDOK	LT	LAT
										PO	LT	LAT	PO	LT	LAT
										HDDK	LT	LAT	HDDK	LT	LAT
										HR	MM	SEC	HR	MM	SEC
YR	DA	YR	DA	YR	DA	YR	DA	YR	DA	YR	DA	YR	DA	YR	DA
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78	308	78	308	78	308
78	308	78	308	78	308	78	308	78	308	78					

189

191

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	BLAT	MIDNIGHT	BLAT	MIDNIGHT	YR	DA	YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	BLAT	MIDNIGHT	
78	324	8	5	18		S	211	620	211	623	2	605	613	7	600	78	325	78	325	10	37	9	N	214	616	214	623	7	600
78	324	8	21	41		S	92	639	82	652	13	618	643	10	599	78	325	78	325	11	9	23	N	201	622	201	632	10	599
78	324	8	59	3		N	89	672	89	663	-9	655	655	-16	665	78	325	78	325	12	23	32	S	97	684	96	688	-8	657
78	324	9	14	15		N	210	590	210	592	2	571	583	82	682	78	325	78	325	12	2	35	N	219	619	218	630	11	603
78	324	9	45	15		S	206	603	206	602	-1	578	590	12	618	78	325	78	325	12	18	31	S	190	660	189	670	10	628
78	324	10	1	59		S	88	632	88	635	30	614	638	12	625	78	325	78	325	12	52	18	S	190	660	189	670	10	628
78	324	10	38	33		N	88	649	89	661	12	629	637	13	644	78	325	78	325	13	4	23	S	108	681	106	684	-27	657
78	324	10	54	49		N	215	608	215	617	5	591	607	17	619	78	325	78	325	13	59	59	N	220	628	221	645	17	619
78	324	11	26	39		S	200	616	200	632	16	593	617	15	624	78	325	78	325	15	26	24	N	221	631	225	654	33	622
78	324	11	41	29		S	98	665	98	672	7	641	660	15	641	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	12	18	58		N	82	643	82	643	12	596	613	17	623	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	12	36	14		N	218	612	218	624	12	596	613	17	623	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	13	9	36		S	190	647	190	647	0	514	624	19	633	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	13	23	2		S	106	646	106	667	21	606	643	19	633	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	14	0	23		N	72	625	73	620	-5	609	612	19	633	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	14	18	27		N	218	601	218	614	13	583	604	19	633	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	14	52	36		S	180	644	179	650	5	597	592	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	15	42	23		N	67	588	67	626	38	576	627	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	16	0	12		N	219	601	219	605	4	583	595	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	16	36	7		S	174	636	173	643	7	559	583	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	17	43	0		N	216	567	216	583	21	546	580	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	19	8	49		N	65	599	65	595	0	577	597	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	19	24	52		N	220	567	220	572	5	549	557	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	20	4	5		S	170	637	169	639	2	561	582	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	20	50	35		S	69	581	68	595	14	568	593	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	21	5	51		N	223	582	224	596	14	565	582	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	22	33	21		N	69	620	69	614	-6	510	614	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	22	49	20		N	223	597	223	603	6	583	590	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	23	42	35		S	158	629	158	636	7	579	601	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	324	23	42	35		S	92	600	92	601	1	562	584	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	0	13	59		N	70	597	69	613	16	576	613	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	0	32	24		N	216	609	216	609	0	592	595	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	1	7	16		S	195	614	195	630	16	576	609	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	1	24	45		S	83	591	83	608	17	565	593	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	1	55	10		N	69	588	69	611	22	576	611	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	2	14	11		N	207	628	207	634	6	606	619	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	2	48	14		S	202	629	202	635	10	607	623	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	3	5	0		N	78	615	78	640	22	601	634	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	3	38	19		N	72	636	72	638	2	621	632	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	2	54	25		N	203	648	203	655	7	628	638	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	4	28	11		S	210	623	210	634	11	608	623	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	4	45	33		S	90	611	79	617	6	587	609	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	5	19	7		N	81	623	81	603	-20	601	587	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	5	34	36		N	204	648	204	661	13	628	643	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	6	8	14		S	214	626	214	626	0	611	615	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	6	25	9		S	81	624	81	616	-2	594	602	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	6	59	20		N	86	600	86	600	0	575	584	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	7	15	23		S	206	626	206	628	2	604	613	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	7	48	36		S	212	538	212	552	14	625	640	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	8	5	8		S	82	623	82	631	8	601	619	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	8	40	35		N	89	628	89	635	7	605	624	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	8	56	20		S	210	610	210	615	5	593	605	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	9	28	8		S	207	609	207	616	7	585	603	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622
78	325	9	45	4		S	87	526	87	569	43	604	622	22	646	78	325	78	325	15	41	38	N	221	631	225	654	33	622

197

		HDDK		CDDK		MIDNIGHT		HDDK		CDDK		MIDNIGHT	
YR	DA	HR	MN	SEC	PO	LT	LAT	LT	LAT	LT	LAT	LT	LAT
78 331	8 38 20	N	89	664	3	646	660	78 332	11 56 4	N	219	668	2 558 657
78 331	8 52 26	N	209	631	-3	628	613	78 332	12 32 33	S	189	697	8 660 667
78 331	9 24 59	S	207	614	208	626	612	78 332	12 44 36	S	104	658	5 624 637
78 331	9 41 28	S	87	637	87	641	630	78 332	13 23 21	N	73	672	-17 660 650
78 331	10 33 58	S	214	610	214	620	610	78 332	13 37 55	N	232	659	5 655 656
78 331	11 6 25	S	201	634	201	643	627	78 332	14 14 55	S	179	677	18 624 647
78 331	11 21 53	S	94	635	96	667	653	78 332	15 3 32	N	222	642	5 668 632
78 331	11 58 42	S	83	656	83	665	658	78 332	15 20 31	N	221	637	5 629 625
78 331	12 16 0	S	218	620	218	620	610	78 332	17 2 27	N	222	632	4 623 625
78 331	12 48 28	S	192	645	66	563	644	78 332	18 33 40	N	222	632	5 623 625
78 331	13 37 59	N	77	583	73	649	585	78 332	18 44 12	N	239	716	83 625 *716
78 331	13 57 58	N	218	590	218	594	585	78 332	20 15 54	N	239	716	83 625 *716
78 331	14 29 44	S	187	623	186	610	576	78 332	20 25 12	N	231	664	-58 628 630
78 331	14 43 21	S	115	650	8	594	625	78 332	23 50 52	N	231	664	4 664 668
78 331	15 21 16	N	68	600	10	578	599	78 333	0 31 59	S	189	698	2 661 662
78 331	15 39 47	N	218	588	10	569	589	78 333	0 42 59	S	91	709	-2 698 710
78 331	16 14 53	S	173	638	173	648	589	78 333	1 19 59	N	65	664	-9 668 668
78 331	16 26 26	S	119	623	549	583	589	78 333	1 33 48	N	214	684	0 676 670
78 331	17 21 52	N	218	575	17	554	583	78 333	2 25 14	S	198	689	9 561 569
78 331	18 43 9	N	63	599	28	565	593	78 333	3 1 29	N	79	681	-28 669 648
78 331	19 3 24	N	222	610	28	565	593	78 333	3 14 59	N	68	675	-21 670 658
78 331	20 29 25	N	69	571	11	587	579	78 333	3 52 32	S	203	700	-3 685 675
78 331	20 45 20	N	223	594	18	579	600	78 333	4 5 36	S	208	687	9 670 675
78 331	22 13 21	N	66	643	-45	636	589	78 333	4 42 45	N	77	682	670 648
78 331	22 27 5	S	226	626	-1	616	614	78 333	4 55 32	N	204	696	7 680 681
78 331	23 7 59	S	182	682	160	701	608	78 333	5 32 35	S	216	689	5 681 680
78 331	23 20 51	S	95	626	96	634	612	78 333	5 46 0	S	78	668	655 655
78 331	23 53 11	N	70	597	69	613	612	78 333	6 25 0	N	85	724	612 667
78 332	0 9 7	S	220	664	-21	651	633	78 333	6 35 33	N	205	701	1 696 686
78 332	0 49 0	S	191	690	662	630	630	78 333	7 12 43	S	216	699	1 691 685
78 332	1 2 32	S	86	641	60	679	624	78 333	7 25 0	S	79	691	-22 680 662
78 332	1 37 47	S	67	623	-60	679	624	78 333	8 5 9	N	89	688	-23 698 684
78 332	2 28 47	S	200	655	18	646	653	78 333	8 52 45	N	208	706	-6 691 678
78 332	2 43 52	S	78	638	2	621	632	78 333	9 15 49	S	210	699	-4 692 681
78 332	3 17 59	N	70	649	-2	635	642	78 333	9 4 18	S	84	713	-18 700 692
78 332	3 33 40	S	203	653	6	633	641	78 333	9 45 58	N	89	729	-5 718 724
78 332	4 8 40	S	209	654	-20	642	630	78 333	9 57 19	N	213	676	3 697 656
78 332	4 23 35	S	77	656	-9	643	643	78 333	10 32 57	S	203	681	-2 664 659
78 332	4 59 28	N	73	648	8	642	650	78 333	10 44 29	S	94	706	-15 710 706
78 332	5 13 41	N	204	662	215	662	650	78 333	11 39 13	N	218	651	-3 639 638
78 332	5 48 38	S	215	654	-8	642	650	78 333	12 13 58	S	194	654	9 633 647
78 332	6 3 33	S	79	656	-27	642	650	78 333	12 25 34	S	107	707	9 696 715
78 332	6 40 59	N	86	650	-15	644	650	78 333	13 5 33	N	76	665	1 652 662
78 332	6 53 58	N	206	657	13	642	654	78 333	13 20 3	S	222	670	-18 668 643
78 332	7 28 35	S	214	654	-8	642	654	78 333	13 57 57	N	174	710	14 654 665
78 332	7 42 59	S	80	668	8	650	652	78 333	14 48 28	N	64	667	672 672
78 332	8 21 7	S	89	666	-5	648	654	78 333	15 2 1	N	224	665	1 661 657
78 332	8 34 4	N	209	667	-4	648	654	78 333	15 14 18	N	58	639	-14 635 626
78 332	9 8 58	S	209	661	10	642	652	78 333	16 14 18	N	223	630	7 613 619
78 332	9 23 17	S	86	662	-8	644	649	78 333	17 27 0	N	53	691	-44 692 650
78 332	10 15 0	S	214	664	-3	654	649	78 333	18 58 34	N	234	685	0 685 685
78 332	10 50 0	S	201	670	15	652	665	78 333	20 52 53	S	163	685	529 529
78 332	11 3 57	S	94	656	7	650	677	78 333	21 40 9	N	62	670	-19 690 675
78 332	11 42 14	N	84	684	-1	656	677	78 333					

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDCK	LT	LAT	DLAT	MIDNIGHT	LT	LAT	CDCK	LT	LAT	DLAT	MIDNIGHT
78	338	23	48	59	N	222	632	222	630	630	630	2	630	630	630	222	630	630	2	630
78	339	0	27	0	S	191	640	191	640	640	640	12	640	640	640	191	640	640	12	640
78	339	0	41	51	S	88	643	88	643	643	643	11	643	643	643	88	643	643	11	643
78	339	1	14	43	N	68	617	66	636	636	636	19	607	636	636	66	636	636	19	607
78	339	1	32	25	N	210	629	211	638	638	638	9	615	637	637	211	638	638	9	615
78	339	2	7	30	S	193	635	198	642	642	642	7	630	639	639	198	642	642	7	630
78	339	2	23	25	N	79	637	79	642	642	642	5	622	636	636	79	642	642	5	622
78	339	3	55	49	N	69	632	69	623	623	623	-10	625	624	624	69	623	623	-10	625
78	339	3	13	19	N	203	648	203	643	643	643	-5	628	627	627	203	643	643	-5	628
78	339	3	47	30	S	206	625	206	626	626	626	11	602	621	621	206	625	625	11	602
78	339	4	3	52	S	77	639	78	644	644	644	-35	624	595	595	78	644	644	-35	624
78	339	4	38	0	N	77	628	77	631	631	631	3	612	624	624	77	628	628	3	612
78	339	4	53	29	N	203	658	203	650	650	650	-6	635	633	633	203	658	658	-6	635
78	339	5	28	25	S	214	655	214	659	659	659	4	643	647	647	214	655	655	4	643
78	339	5	44	38	S	80	620	84	622	622	622	15	593	609	609	84	622	622	15	593
78	339	6	33	31	N	205	659	205	672	672	672	12	640	653	653	205	659	659	12	640
78	339	7	8	40	S	81	648	81	651	651	651	3	628	642	642	81	648	648	3	628
78	339	7	23	32	S	88	633	88	638	638	638	6	612	627	627	88	633	633	6	612
78	339	7	59	47	N	208	672	208	678	678	678	6	654	658	658	208	672	672	6	654
78	339	8	13	29	S	210	666	210	667	667	667	1	656	654	654	210	666	666	1	656
78	339	8	48	46	S	84	660	84	660	660	660	0	641	652	652	84	660	660	0	641
78	339	9	3	4	S	84	660	84	660	660	660	0	641	652	652	84	660	660	0	641
78	339	9	54	11	N	213	672	213	671	671	671	-1	662	658	658	213	672	672	-1	662
78	339	10	29	23	S	203	665	203	669	669	669	3	647	650	650	203	665	665	3	647
78	339	10	43	0	S	92	673	92	671	671	671	-2	651	658	658	92	673	673	-2	651
78	339	11	21	18	N	85	668	85	668	668	668	0	650	661	661	85	668	668	0	650
78	339	11	35	29	N	213	666	213	666	666	666	0	656	653	653	213	666	666	0	656
78	339	12	11	31	S	192	699	192	692	692	692	3	661	664	664	192	699	699	3	661
78	339	12	22	7	S	107	716	105	694	694	694	-22	705	683	683	105	694	694	-22	705
78	339	13	2	57	N	75	684	76	671	671	671	11	664	671	671	76	684	684	11	664
78	339	13	16	57	N	221	667	222	678	678	678	7	673	671	671	222	667	667	7	673
78	339	13	55	17	S	174	708	173	715	715	715	-23	680	665	665	173	708	708	-23	680
78	339	14	45	50	N	62	684	65	661	661	661	11	666	673	673	65	661	661	11	666
78	339	14	58	33	N	224	669	225	680	680	680	4	672	684	684	225	669	669	4	672
78	339	18	11	57	N	56	673	55	677	677	677	8	623	630	630	55	673	673	8	623
78	339	18	23	26	N	222	632	223	640	640	640	-7	646	649	649	223	632	632	-7	646
78	339	19	53	34	N	61	653	62	646	646	646	-6	627	631	631	62	653	653	-6	627
78	339	20	5	23	N	235	635	226	641	641	641	-21	668	655	655	226	635	635	-21	668
78	339	21	36	3	N	63	673	65	652	652	652	5	640	652	652	65	673	673	5	640
78	339	21	47	37	N	227	646	228	651	651	651	8	597	615	615	228	646	646	8	597
78	339	23	15	31	N	70	614	70	622	622	622	-1	662	656	656	70	614	614	-1	662
78	339	23	30	11	N	225	665	225	664	664	664	16	664	677	677	225	665	665	16	664
78	340	0	11	24	S	188	700	187	716	716	716	-54	685	636	636	187	700	700	-54	685
78	340	0	59	37	N	84	682	89	646	646	646	0	626	636	636	89	646	646	0	626
78	340	1	12	38	N	216	689	216	692	692	692	13	681	678	678	216	689	689	13	681
78	340	1	51	43	S	198	687	197	703	703	703	12	659	676	676	197	687	687	12	659
78	340	2	3	47	S	79	711	79	650	650	650	-61	702	645	645	79	711	711	-61	702
78	340	2	40	33	N	205	695	204	682	682	682	-48	669	619	619	204	695	695	-48	669
78	340	2	54	45	N	205	685	204	682	682	682	-3	668	662	662	204	685	685	-3	668
78	340	3	31	48	S	207	682	207	682	682	682	6	659	662	662	207	682	682	6	659
78	340	3	45	41	S	75	666	76	665	665	665	-29	683	661	661	76	666	666	-29	683
78	340	4	22	29	N	76	694	76	665	665	665	-29	683	661	661	76	694	694	-29	683

YR	DA	HR	MIN	SEC	PO	HOOK	LT	LAT	COCK	DLAT	MIDNIGHT	YR	DA	HR	MIN	SEC	PO	HOOK	LT	LAT	COCK	DLAT	MIDNIGHT	
78	341	11	48	11	S	99	697	57	685	-24	680 66	78	343	4	20	12	S	4	20	12	211	672	0	662 659
78	341	12	41	29	S	220	683	220	685	2	683 678	78	343	4	35	5	S	4	35	5	76	647	8	624 642
78	341	13	19	16	S	183	708	181	717	9	673 672	78	343	5	10	0	N	5	10	0	80	646	-1	627 636
78	341	13	28	14	S	114	716	117	729	12	703 668	78	343	5	24	11	N	5	24	11	202	670	5	652 656
78	341	17	36	59	N	54	683	54	682	-1	684 689	78	343	5	59	58	S	5	59	58	216	665	-2	657 652
78	341	17	45	54	N	226	675	227	679	4	673 672	78	343	6	13	57	S	6	13	57	77	669	655	655
78	341	19	20	0	N	53	694	54	691	-3	696 699	78	343	6	51	56	N	6	51	56	87	653	-30	667 644
78	341	19	23	28	N	231	684	230	679	-5	684 679	78	343	10	25	8	N	10	25	8	213	690	-1	682 675
78	341	21	1	8	N	61	674	61	676	2	669 681	78	343	11	1	43	S	11	1	43	94	679	-2	681 677
78	341	21	11	33	N	229	666	232	685	20	663 686	78	343	11	14	7	S	11	14	7	94	679	-2	681 677
78	341	22	43	1	N	63	682	65	672	-10	678 677	78	343	11	53	17	N	11	53	17	84	650	4	669 668
78	341	22	53	39	N	230	690	230	691	1	690 691	78	343	12	6	44	N	12	6	44	218	670	4	669 668
78	341	23	37	20	S	153	716	153	716	0	683 677	78	343	12	43	33	S	12	43	33	189	692	12	661 672
78	341	23	46	48	S	99	718	96	694	-24	706 689	78	343	12	53	43	S	12	53	43	108	706	-7	704 700
78	342	0	24	30	N	64	682	64	687	5	676 693	78	343	13	30	39	N	13	30	39	222	662	-1	698 653
78	342	0	35	4	N	224	719	221	696	-20	723 692	78	343	16	44	18	N	16	44	18	53	696	-1	699 704
78	342	1	17	29	S	194	689	194	703	4	672 673	78	343	16	54	8	N	16	54	8	226	631	-16	680 674
78	342	1	29	5	S	83	705	82	671	-38	696 684	78	343	18	26	32	N	18	26	32	54	678	-16	678 678
78	342	2	6	49	N	54	706	55	688	-18	704 695	78	343	18	36	2	N	18	36	2	228	681	1	679 674
78	342	2	19	19	N	208	702	208	703	1	687 681	78	343	20	8	35	N	20	8	35	59	673	61	651
78	342	2	57	41	S	204	687	204	692	5	687 671	78	343	20	17	45	N	20	17	45	232	686	-22	672 654
78	342	3	11	5	S	75	670	75	677	7	657 674	78	343	23	43	19	N	23	43	19	228	702	-3	689 686
78	342	3	47	50	N	72	693	72	697	-1	698 695	78	343	0	26	18	S	0	26	18	188	722	6	690 689
78	342	4	37	55	S	214	688	214	687	-3	683 675	78	343	0	37	20	S	0	37	20	83	687	88	674
78	342	4	51	38	S	76	657	76	657	-1	650 673	78	343	1	14	8	N	1	14	8	63	695	-7	693 693
78	342	5	28	31	N	82	685	82	685	11	670 694	78	343	2	6	18	S	2	6	18	198	701	10	675 691
78	342	5	40	58	N	202	686	202	685	-1	669 665	78	343	2	19	0	S	2	19	0	78	677	67	695
78	342	6	17	29	S	218	678	217	676	-2	669 663	78	343	2	55	29	N	2	55	29	67	695	1	692 703
78	342	6	30	39	S	76	661	73	727	45	659 728	78	343	3	8	5	N	3	8	5	204	712	204	715
78	342	7	10	1	N	89	711	89	710	-1	698 708	78	343	3	46	39	S	3	46	39	209	699	209	699
78	342	10	43	11	N	214	668	214	660	-3	656 655	78	343	4	59	44	S	4	59	44	74	667	73	613
78	342	11	18	53	S	200	689	200	686	-3	673 655	78	343	4	36	18	N	4	36	18	77	683	77	635
78	342	11	31	12	S	96	688	96	685	-3	699 677	78	343	4	42	41	S	4	42	41	201	708	201	711
78	342	12	10	47	N	82	695	82	695	-20	680 669	78	343	5	26	0	S	5	26	0	216	679	217	690
78	342	12	24	51	N	218	656	218	668	10	647 655	78	343	5	39	45	S	5	39	45	76	665	35	678
78	342	13	1	10	S	187	697	186	703	6	660 665	78	343	6	17	19	N	6	17	19	85	689	202	709
78	342	13	12	34	S	106	673	107	682	9	646 665	78	343	6	28	48	N	6	28	48	203	709	203	709
78	342	15	47	45	N	223	671	223	672	-4	659 664	78	343	7	5	28	S	7	5	28	216	665	217	695
78	342	20	43	0	N	83	636	83	652	-4	650 655	78	343	9	39	19	N	9	39	19	90	721	90	728
78	342	20	54	47	N	226	641	226	642	-3	650 655	78	343	9	50	1	S	9	50	1	211	704	211	709
78	342	22	24	27	N	36	651	37	648	-3	644 651	78	343	10	27	19	S	10	27	19	204	707	-5	698 685
78	342	22	37	31	N	226	647	227	662	15	641 653	78	343	10	38	29	S	10	38	29	91	712	92	715
78	342	23	19	46	S	181	709	180	719	10	674 680	78	343	11	31	2	N	11	31	2	217	704	217	706
78	342	23	29	46	S	99	699	95	659	-40	683 642	78	343	12	9	25	S	12	9	25	190	729	191	721
78	342	0	5	57	N	27	653	27	657	4	646 661	78	343	12	12	32	S	12	12	32	106	729	106	729
78	343	0	19	35	N	222	684	222	680	-6	634 684	78	343	13	12	32	S	13	12	32	222	701	222	701
78	343	1	0	33	S	192	711	193	705	-6	686 675	78	343	13	51	34	S	13	51	34	178	703	178	703
78	343	1	12	21	S	85	635	85	635	-36	669 680	78	343	18	9	7	N	18	9	7	53	684	54	680
78	343	1	48	57	N	64	694	67	658	-36	669 680	78	343	18	18	0	N	18	18	0	230	693	230	693
78	343	2	1	59	N	210	697	210	695	-2	650 681	78	343	19	52	15	N	19	52	15	52	704	51	707
78	343	2	40	30	S	202	690	202	693	-3	674 672	78	343	20	0	15	N	20	0	15	231	687	232	692
78	343	2	53	20	S	75	686	76	643	-43	675 637	78	343	21	34	5	N	21	34	5	56	707	55	711
78	343	3	43	36	S	202	683	202	681	-2	666 661	78	343	21	42	43	N	21	42	43	232	690	233	693

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	LT	LAT	MIDNIGHT	LT	LAT	CDDK	LT	LAT	MIDNIGHT
78	350	20	17	31	N	222	595	222	600	222	600	531	587	222	600	222	600	531
78	350	21	44	39	N	224	604	224	607	224	607	533	586	224	607	224	607	533
78	350	22	40	36	S	178	672	179	670	179	670	532	585	179	670	179	670	532
78	350	22	53	25	S	97	623	97	630	97	630	530	582	97	630	97	630	530
78	350	23	26	34	N	67	619	69	598	69	598	529	577	69	598	69	598	529
78	350	23	41	41	N	222	649	222	648	222	648	533	581	222	648	222	648	533
78	351	0	21	28	S	188	673	183	680	183	680	532	580	183	680	183	680	532
78	351	0	34	59	S	86	650	86	650	86	650	530	582	86	650	86	650	530
78	351	1	8	14	N	66	625	66	629	66	629	531	583	66	629	66	629	531
78	351	1	24	33	N	212	660	212	661	212	661	532	584	212	661	212	661	532
78	351	2	1	19	S	196	647	196	656	196	656	531	585	196	656	196	656	531
78	351	2	16	0	S	78	664	78	670	78	670	531	586	78	670	78	670	531
78	351	2	50	59	N	66	661	68	610	68	610	531	587	68	610	68	610	531
78	351	3	6	33	N	202	649	202	650	202	650	532	588	202	650	202	650	532
78	351	3	41	37	S	204	637	204	638	204	638	532	589	204	638	204	638	532
78	351	3	57	41	S	76	627	75	627	75	627	531	590	75	627	75	627	531
78	351	4	31	50	N	75	648	74	648	74	648	532	591	74	648	74	648	532
78	351	4	47	0	N	201	648	201	649	201	649	533	592	201	649	201	649	533
78	351	5	21	0	S	211	626	211	631	211	631	533	593	211	631	211	631	533
78	351	5	37	39	S	78	631	78	640	78	640	533	594	78	640	78	640	533
78	351	6	14	7	N	63	692	63	692	63	692	534	595	63	692	63	692	534
78	351	7	16	52	S	79	651	80	632	80	632	534	596	80	632	80	632	534
78	351	7	53	30	N	87	648	87	647	87	647	535	597	87	647	87	647	535
78	351	8	7	23	N	207	649	207	651	207	651	535	598	207	651	207	651	535
78	351	8	41	31	S	209	642	209	649	209	649	536	599	209	649	209	649	536
78	351	8	58	4	S	83	618	83	639	83	639	536	600	83	639	83	639	536
78	351	13	10	25	N	220	659	225	719	225	719	537	601	225	719	225	719	537
78	351	13	45	59	S	185	647	179	686	179	686	538	602	179	686	179	686	538
78	351	13	57	48	S	142	676	113	684	113	684	539	603	113	684	113	684	539
78	351	14	28	1	N	65	659	65	659	65	659	540	604	65	659	65	659	540
78	351	14	52	29	N	221	651	222	664	222	664	540	605	222	664	222	664	540
78	351	18	5	27	N	52	672	58	628	58	628	541	606	58	628	58	628	541
78	351	18	16	3	N	224	648	225	658	225	658	542	607	225	658	225	658	542
78	351	23	24	29	N	222	632	222	634	222	634	543	608	222	634	222	634	543
78	351	0	3	8	S	182	643	186	657	186	657	544	609	186	657	186	657	544
78	352	0	16	5	S	92	693	91	670	91	670	545	610	91	670	91	670	545
78	352	0	51	28	N	65	645	65	644	65	644	546	611	65	644	65	644	546
78	352	1	7	16	N	213	648	213	652	213	652	547	612	213	652	213	652	547
78	352	1	44	54	S	194	676	194	676	194	676	548	613	194	676	194	676	548
78	352	1	59	25	S	79	637	79	654	79	654	549	614	79	654	79	654	549
78	352	2	32	38	N	66	636	66	636	66	636	550	615	66	636	66	636	550
78	352	2	48	25	N	204	673	204	678	204	678	551	616	204	678	204	678	551
78	352	3	24	51	S	203	663	203	673	203	673	552	617	203	673	203	673	552
78	352	3	40	42	S	76	618	74	659	74	659	553	618	74	659	74	659	553
78	352	4	13	34	N	73	621	73	635	73	635	554	619	73	635	73	635	554
78	352	4	28	54	N	201	677	201	677	201	677	555	620	201	677	201	677	555
78	352	5	4	34	S	211	652	211	657	211	657	556	621	211	657	211	657	556
78	352	5	20	47	S	78	621	78	631	78	631	557	622	78	631	78	631	557
78	352	5	56	30	N	82	593	82	593	82	593	558	623	82	593	82	593	558
78	352	6	10	11	N	203	636	203	639	203	639	559	624	203	639	203	639	559
78	352	6	43	51	S	212	631	212	630	212	630	560	625	212	630	212	630	560
78	352	6	59	59	S	79	642	78	665	78	665	561	626	78	665	78	665	561
78	352	7	36	8	N	87	647	87	660	87	660	562	627	87	660	87	660	562

YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	LOOK	LT	LAT	DLAT	MIDNIGHT	LA-T-H-LATC	YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	DLAT	MIDNIGHT	LA-T-H-LATC	
78	353	9	46	31	S	203	611	205	622	11	587	608	194	596	78	353	9	46	31	S	203	611	205	622	11	587	608
78	353	10	3	35	S	87	623	87	620	6	599	611	194	596	78	353	10	3	35	S	87	623	87	620	6	599	611
78	353	10	38	37	N	214	615	214	621	6	599	611	194	596	78	353	10	38	37	N	214	615	214	621	6	599	611
78	353	10	55	22	S	199	631	198	643	12	595	620	194	596	78	353	10	55	22	S	199	631	198	643	12	595	620
78	353	11	28	6	S	95	633	95	643	10	602	620	194	596	78	353	11	28	6	S	95	633	95	643	10	602	620
78	353	11	43	44	S	82	601	81	615	14	575	601	194	596	78	353	11	43	44	S	82	601	81	615	14	575	601
78	353	12	18	31	N	217	615	217	620	5	594	610	194	596	78	353	12	18	31	N	217	615	217	620	5	594	610
78	353	12	36	55	N	190	630	189	640	10	594	610	194	596	78	353	12	36	55	N	190	630	189	640	10	594	610
78	353	13	10	0	S	105	650	111	605	45	612	751	194	596	78	353	13	10	0	S	105	650	111	605	45	612	751
78	353	13	24	3	N	74	561	72	609	40	599	601	194	596	78	353	13	24	3	N	74	561	72	609	40	599	601
78	353	13	59	10	N	216	581	217	632	21	561	593	194	596	78	353	13	59	10	N	216	581	217	632	21	561	593
78	353	14	19	57	S	182	519	180	633	14	526	536	194	596	78	353	14	19	57	S	182	519	180	633	14	526	536
78	353	14	52	34	S	110	609	118	661	52	526	536	194	596	78	353	14	52	34	S	110	609	118	661	52	526	536
78	353	15	6	57	S	66	595	66	581	25	541	578	194	596	78	353	15	6	57	S	66	595	66	581	25	541	578
78	353	15	42	10	N	217	598	218	610	12	540	600	194	596	78	353	15	42	10	N	217	598	218	610	12	540	600
78	353	16	1	4	N	218	588	219	596	8	563	537	194	596	78	353	16	1	4	N	218	588	219	596	8	563	537
78	353	17	43	3	N	65	574	65	570	-4	560	535	194	596	78	353	17	43	3	N	65	574	65	570	-4	560	535
78	353	19	25	23	N	219	574	220	593	19	553	573	194	596	78	353	19	25	23	N	219	574	220	593	19	553	573
78	353	20	51	0	N	59	569	67	595	27	553	593	194	596	78	353	20	51	0	N	59	569	67	595	27	553	593
78	353	21	6	59	N	223	597	223	597	0	533	594	194	596	78	353	21	6	59	N	223	597	223	597	0	533	594
78	353	22	32	28	N	69	599	69	604	5	538	603	194	596	78	353	22	32	28	N	69	599	69	604	5	538	603
78	353	22	48	33	N	205	538	205	538	-4	630	644	194	596	78	353	22	48	33	N	205	538	205	538	-4	630	644
78	353	23	29	38	S	193	578	183	681	3	633	644	194	596	78	353	23	29	38	S	193	578	183	681	3	633	644
78	353	23	41	36	S	96	667	96	666	-1	644	651	194	596	78	353	23	41	36	S	96	667	96	666	-1	644	651
78	354	0	14	36	N	69	591	68	616	25	579	616	194	596	78	354	0	14	36	N	69	591	68	616	25	579	616
78	354	0	32	6	N	217	636	217	640	4	622	629	194	596	78	354	0	32	6	N	217	636	217	640	4	622	629
78	354	1	8	51	S	193	629	193	640	11	593	618	194	596	78	354	1	8	51	S	193	629	193	640	11	593	618
78	354	1	24	48	S	93	628	82	587	-41	606	569	194	596	78	354	1	24	48	S	93	628	82	587	-41	606	569
78	354	1	55	48	N	68	591	68	591	9	569	589	194	596	78	354	1	55	48	N	68	591	68	591	9	569	589
78	354	2	15	29	N	205	611	205	611	0	587	593	194	596	78	354	2	15	29	N	205	611	205	611	0	587	593
78	354	2	48	28	S	200	600	200	608	8	575	595	194	596	78	354	2	48	28	S	200	600	200	608	8	575	595
78	354	3	6	35	S	77	604	76	630	26	586	623	194	596	78	354	3	6	35	S	77	604	76	630	26	586	623
78	354	3	37	32	N	201	647	201	622	-25	627	593	194	596	78	354	3	37	32	N	201	647	201	622	-25	627	593
78	354	4	28	26	S	207	594	207	612	18	563	599	194	596	78	354	4	28	26	S	207	594	207	612	18	563	599
78	354	4	45	37	S	77	643	78	616	-17	618	608	194	596	78	354	4	45	37	S	77	643	78	616	-17	618	608
78	354	5	20	30	N	79	641	79	622	-13	626	615	194	596	78	354	5	20	30	N	79	641	79	622	-13	626	615
78	354	5	36	41	N	203	604	203	605	1	579	593	194	596	78	354	5	36	41	N	203	604	203	605	1	579	593
78	354	6	8	10	S	212	586	212	595	9	567	586	194	596	78	354	6	8	10	S	212	586	212	595	9	567	586
78	354	6	25	52	S	79	636	79	646	10	621	640	194	596	78	354	6	25	52	S	79	636	79	646	10	621	640
78	354	7	1	49	N	86	658	86	654	-4	639	645	194	596	78	354	7	1	49	N	86	658	86	654	-4	639	645
78	354	7	16	20	N	206	621	206	608	-13	592	595	194	596	78	354	7	16	20	N	206	621	206	608	-13	592	595
78	354	7	48	12	S	211	585	211	613	27	567	603	194	596	78	354	7	48	12	S	211	585	211	613	27	567	603
78	354	8	5	57	S	82	607	81	638	31	593	627	194	596	78	354	8	5	57	S	82	607	81	638	31	593	627
78	354	8	40	31	N	88	593	89	641	48	597	630	194	596	78	354	8	40	31	N	88	593	89	641	48	597	630
78	354	8	56	47	N	209	622	209	622	0	535	603	194	596	78	354	8	56	47	N	209	622	209	622	0	535	603
78	354	9	28	40	S	207	591	207	611	20	565	593	194	596	78	354	9	28	40	S	207	591	207	611	20	565	593
78	354	9	46	4	S	86	631	86	639	8	609	628	194	596	78	354	9	46	4	S	86	631	86	639	8	609	628
78	354	10	38	13	N	213	605	213	609	3	593	609	194	596	78	354	10	38	13	N	213	605	213	609	3	593	609
78	354	11	10	12	S	201	615	201	622	7	591	608	194	596	78	354	11	10	12	S	201	615	201	622	7	591	608
78	354	11	25	57	S	94	647	95	663	17	619	649	194	596	78	354	11	25	57	S	94	647	95	663	17	619	649
78	354	12	0	52	N	84	532	84	532	-11	565	621	194	596	78	354	12	0	52	N	84	532	84	532	-11	565	621
78	354	12	19	35	N	217	609	217	610	1	592	600	194	596	78	354	12	19	35	N	217	609	217	610	1	592	600

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDXX	PLAT	LATH,LATC	YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDXX	PLAT	LATH,LATC
78	355	16	53	32	N	57	629	56	656	6	650	78	357	1	21	12	N	213	655	213	658	3	643
78	355	17	6	35	N	21	629	23	635	6	622	78	357	1	58	20	S	195	657	196	659	2	625
78	355	18	35	2	N	61	611	59	623	12	621	78	357	2	12	45	S	79	661	79	664	-7	648
78	355	18	47	35	N	225	651	224	636	-15	625	78	357	2	45	30	N	68	601	68	597	-4	590
78	355	20	19	0	N	58	652	62	635	-27	637	78	357	3	2	45	N	203	663	203	649	-14	644
78	355	20	30	22	N	226	633	226	638	5	628	78	357	3	38	3	S	204	637	204	644	7	616
78	355	22	1	55	N	57	695	65	639	-50	637	78	357	3	55	21	S	77	597	74	643	-19	578
78	355	22	12	35	N	227	648	228	652	4	643	78	357	4	28	52	N	74	662	202	662	4	639
78	355	22	17	15	N	174	715	173	723	8	684	78	357	4	43	24	N	202	658	202	662	4	639
78	355	23	5	44	S	102	681	100	666	-15	657	78	357	5	18	10	S	211	640	212	657	17	627
78	355	23	42	29	N	63	671	69	609	-62	656	78	357	5	34	21	S	78	632	78	632	17	627
78	355	23	55	0	N	189	675	224	674	8	666	78	357	6	9	58	N	83	656	83	662	-4	648
78	356	0	35	35	S	87	659	86	637	-22	646	78	357	6	23	29	N	204	659	204	656	-3	640
78	356	1	23	44	N	63	665	66	624	-41	629	78	357	6	57	59	S	213	636	213	644	8	622
78	356	1	38	36	N	211	663	212	672	9	652	78	357	7	13	5	S	79	665	79	661	-4	652
78	356	2	15	40	S	197	658	197	662	4	626	78	357	7	50	24	N	87	658	87	651	-7	639
78	356	2	30	19	S	78	655	78	674	19	641	78	357	8	4	15	S	210	642	237	643	1	621
78	356	3	21	22	N	201	622	201	631	9	637	78	357	8	37	55	S	83	654	83	656	13	617
78	356	3	54	39	S	205	616	205	617	9	637	78	357	8	53	28	S	83	654	83	656	2	635
78	356	4	11	11	S	76	607	76	620	-13	627	78	357	9	44	20	N	211	662	211	674	5	640
78	356	4	44	36	N	202	589	202	615	13	639	78	357	10	19	3	S	204	652	203	667	12	651
78	356	5	2	36	N	210	570	211	612	26	639	78	357	10	33	16	S	90	669	90	656	15	632
78	356	5	33	15	S	210	570	211	612	42	639	78	357	11	12	7	N	85	698	86	655	-13	646
78	356	5	53	58	S	81	557	81	557	49	639	78	357	11	24	49	N	217	681	217	680	-33	684
78	356	6	25	38	N	84	606	84	606	33	639	78	357	12	1	16	S	194	683	193	692	-1	672
78	356	6	40	35	N	204	665	204	665	-13	646	78	357	12	13	13	S	102	689	100	674	9	654
78	356	7	15	11	S	213	635	213	636	1	621	78	357	12	53	8	N	75	697	77	562	-35	697
78	356	7	30	0	S	79	673	83	647	-25	637	78	357	13	6	34	N	221	670	220	668	-2	688
78	356	8	7	39	N	89	656	89	656	3	637	78	357	13	44	33	S	178	599	176	707	8	659
78	356	8	21	48	N	208	633	208	638	5	611	78	357	13	53	31	S	116	698	111	669	-29	673
78	356	8	55	14	S	209	632	209	634	2	610	78	357	14	49	0	N	221	652	222	659	7	647
78	356	9	5	54	S	94	676	94	654	-24	659	78	357	16	31	4	N	221	642	222	644	2	635
78	356	10	2	19	N	212	642	212	634	-6	629	78	357	18	0	19	N	58	632	60	612	-20	637
78	356	10	35	45	S	203	628	203	639	11	606	78	357	18	13	18	N	222	628	222	631	3	619
78	356	10	50	48	S	92	662	91	652	-6	632	78	357	19	44	7	N	56	658	56	640	-28	667
78	356	11	26	30	N	66	601	66	601	24	576	78	357	19	54	52	N	226	640	226	640	0	633
78	356	11	45	11	N	216	550	216	613	23	571	78	357	21	25	4	N	63	645	63	645	648	671
78	356	12	19	43	S	196	614	196	618	4	576	78	357	21	36	12	N	60	635	64	656	-29	681
78	356	12	32	2	S	100	647	106	707	60	608	78	357	23	8	3	N	193	713	183	704	5	679
78	356	12	7	9	N	79	580	78	613	24	570	78	357	23	18	3	S	93	688	93	680	-8	665
78	356	13	7	47	N	218	618	219	624	5	602	78	357	23	44	4	S	93	688	93	680	26	614
78	356	15	44	6	S	174	651	171	655	14	593	78	358	0	12	48	N	93	623	93	623	5	676
78	356	18	16	22	N	63	585	59	622	37	572	78	358	1	42	24	S	194	702	193	707	2	670
78	356	18	31	19	N	221	614	221	613	-1	622	78	358	1	54	35	S	81	686	81	689	-22	683
78	356	19	58	58	N	65	589	63	600	19	577	78	358	2	30	59	N	205	570	205	677	7	652
78	356	20	13	15	N	224	619	225	627	9	607	78	358	2	45	7	N	205	570	205	677	7	652
78	356	21	43	0	N	62	658	64	642	-16	632	78	358	3	22	31	S	203	633	203	701	-10	632
78	356	21	55	20	N	225	634	226	636	2	625	78	358	3	35	39	S	75	674	75	664	4	682
78	356	23	22	59	N	68	615	223	629	11	635	78	358	4	11	50	N	72	674	72	678	11	688
78	356	23	38	7	N	188	673	187	692	19	632	78	358	4	25	20	S	211	647	212	678	31	685
78	357	0	18	11	S	89	642	89	651	-11	634	78	358	5	1	11	N	76	664	76	694	30	651
78	357	1	5	39	N	65	649	67	623	-26	624	78	358	5	16	2	S	76	664	76	694	30	651

YR	DA	HR	MO	SEC	PO	MOCK	LT	LAT	CDXA	DLAT	MIDNIGHT	LT	LAT	CDXA	DLAT	MIDNIGHT
78	360	12	0	19	N	81	655	217	632	-20	655	81	655	217	632	655
78	360	12	15	45	N	81	655	217	632	-20	655	81	655	217	632	655
78	360	12	49	0	S	192	633	105	667	33	637	192	633	105	667	637
78	360	13	2	42	S	192	633	105	667	33	637	192	633	105	667	637
78	360	13	40	57	N	72	552	73	639	-15	639	73	639	105	667	637
78	360	14	33	37	N	219	634	219	637	4	637	219	637	219	637	637
78	360	14	33	37	N	176	676	176	676	4	637	176	676	176	676	637
78	360	15	22	39	S	65	612	65	612	4	637	65	612	65	612	637
78	360	15	36	59	N	215	623	220	632	3	623	215	623	220	632	637
78	360	15	36	59	N	204	685	204	685	3	623	204	685	204	685	637
78	362	7	12	44	S	214	655	214	655	7	655	214	655	214	655	637
78	362	7	27	52	S	80	640	78	667	18	667	80	640	78	667	637
78	362	8	3	50	N	87	543	87	543	24	623	87	543	87	543	637
78	362	8	17	37	N	207	660	207	660	33	641	207	660	207	660	637
78	362	8	52	40	S	209	660	209	660	27	641	209	660	209	660	637
78	362	9	6	57	S	83	664	83	664	-1	646	83	664	83	664	637
78	362	9	46	0	N	88	709	88	709	-1	646	88	709	88	709	637
78	362	9	58	6	N	212	668	212	668	20	658	212	668	212	668	637
78	362	10	33	31	S	202	670	202	670	2	658	202	670	202	670	637
78	362	10	33	31	S	93	701	93	701	-1	658	93	701	93	701	637
78	362	11	38	50	N	217	660	217	660	5	671	217	660	217	660	637
78	362	12	15	17	S	192	680	190	706	26	651	190	706	190	706	637
78	362	12	25	21	S	100	655	102	681	26	619	102	681	102	681	637
78	362	13	6	58	N	74	691	74	691	-4	630	74	691	74	691	637
78	362	13	20	31	N	221	672	221	672	4	670	221	672	221	672	637
78	362	13	20	31	N	173	709	173	709	20	643	173	709	173	709	637
78	362	14	8	1	S	115	656	114	681	-5	653	114	681	114	681	637
78	362	14	49	13	N	62	674	62	674	-1	656	62	674	62	674	637
78	362	15	2	40	N	222	660	222	663	3	656	222	663	222	663	637
78	362	17	22	12	S	176	608	175	613	5	515	175	613	175	613	637
78	362	18	10	58	N	66	533	65	546	12	516	65	546	65	546	637
78	362	18	29	28	N	217	555	217	567	2	543	217	567	217	567	637
78	362	19	54	48	N	66	563	66	563	-6	555	66	563	66	563	637
78	362	20	10	25	N	222	558	222	561	3	584	222	561	222	561	637
78	362	20	10	25	N	103	594	103	594	20	580	103	594	103	594	637
78	362	21	36	31	N	70	567	70	565	-2	545	70	565	70	565	637
78	362	21	52	24	N	224	617	224	622	5	606	224	622	224	622	637
78	362	23	19	40	N	67	620	67	620	5	606	67	620	67	620	637
78	362	23	34	7	N	185	692	185	692	13	639	185	692	185	692	637
78	363	0	14	59	S	187	679	187	679	13	639	187	679	187	679	637
78	363	0	29	10	S	87	612	87	610	-2	588	87	610	87	610	637
78	363	1	0	49	N	67	612	67	610	-2	588	67	610	67	610	637
78	363	2	13	22	N	66	642	66	641	-1	634	66	641	66	641	637
78	363	2	59	1	N	204	572	204	679	7	654	204	679	204	679	637
78	363	3	25	29	S	203	663	204	667	4	644	204	667	204	667	637
78	363	3	51	11	S	76	621	75	625	-34	644	75	625	75	625	637
78	363	4	25	15	N	73	658	74	624	0	647	74	624	74	624	637
78	363	4	39	44	N	201	666	201	666	10	632	201	666	201	666	637
78	363	5	14	58	S	211	645	211	655	10	632	211	655	211	655	637
78	363	5	29	50	S	76	664	76	664	12	638	76	664	76	664	637
78	363	6	6	14	N	82	667	82	669	12	638	82	669	82	669	637
78	363	6	20	0	N	203	661	203	661	3	642	203	661	203	661	637
78	363	6	55	3	S	213	650	213	650	9	637	213	650	213	650	637
78	363	7	10	13	S	79	651	79	650	9	637	79	650	79	650	637

210